APPENDIX I

COMMENTS ON THE DRAFT PROGRAM EIR AND RESPONSES TO COMMENTS

Note: This appendix is new to the Final Program EIR.

Valspar
1191 Wheeling Rd. / Wheeling, IL 60090
847/541-9000
FAX: 847/541-7549

February 14, 2000

Jim Nyarady
California EPA
Air Resources Board
Stationary Source Division
2020 L Street
Sacramento, Ca. 95814

Dear Jim,

Sorry I missed the conference call on Friday - I did not receive notice of the conference call number until it was too late. I am sending you below some comments on the cost survey that I sent in two weeks ago, and some exposure data that follows up on the data I supplied to you last summer.

1-1 First the cost survey comments. The cost survey I sent shows what Valspar has allocated to R&D efforts to achieve low VOC in the categories supplied. It by no means implies that we can achieve the desired VOC and maintain performance for every quality in every category, it just shows we have dedicated resources to try to do it. The numbers reported total to 44% of my R&D budget. As has been my concern all along, we can make low cost, low quality products that meet the 2002 standards, but we cannot maintain performance in higher quality products that the consumer expects to perform. We get few complaints on low quality paints because consumers don't expect much, but the expectations on higher quality paints ($15 to $25 per gallon price) is much greater.

1-2 Averaging does not appear an option for us because we have a high proportion of our business is high end product, and the amount we can "bank" on low end paint is not enough to make up for what we need on the high end.

1-3 A specific example is the exposure results attached. The paints shown here are the same ones I reported results on last some to you - interior / exterior gloss enamel on the chart titled "Valspar Exterior CARB Data 6.2.99". The bottom three products were put on exposure at the time they were made. The attached photographs show that the low VOC formulations are failing for adhesion when the normal VOC formula is not. The failures are typical of paints that are under-coalesced and have poor film formation. The test substrates painted in these cases are re-paint surfaces that would be a common substrate for gloss paints.

1-3 I also must reiterate my comments from last summer on the resin choices available for low VOC exterior products. There is only one supplier who claims to have a resin suitable for low VOC paints (Rohm & Haas SF-3122). Rohm & Haas will tell you that this resin should be limited to white or light colored flat paints. This is because the resin has poor tint retention properties and higher sheen paints will pick up dirt quickly because it is too soft. We have confirmed these claims. There is no other option for glossy exterior paints that have the proper performance.

I will continue to provide data as it is acquired.

Very truly yours,

Paul S. Sara
Technical Director

PSS/blm
Attachments

CC: Donald Ames – Please see Jim's letter for attachments.
Naveen Berry

Valspar Exterior CARB Data 6.2.99

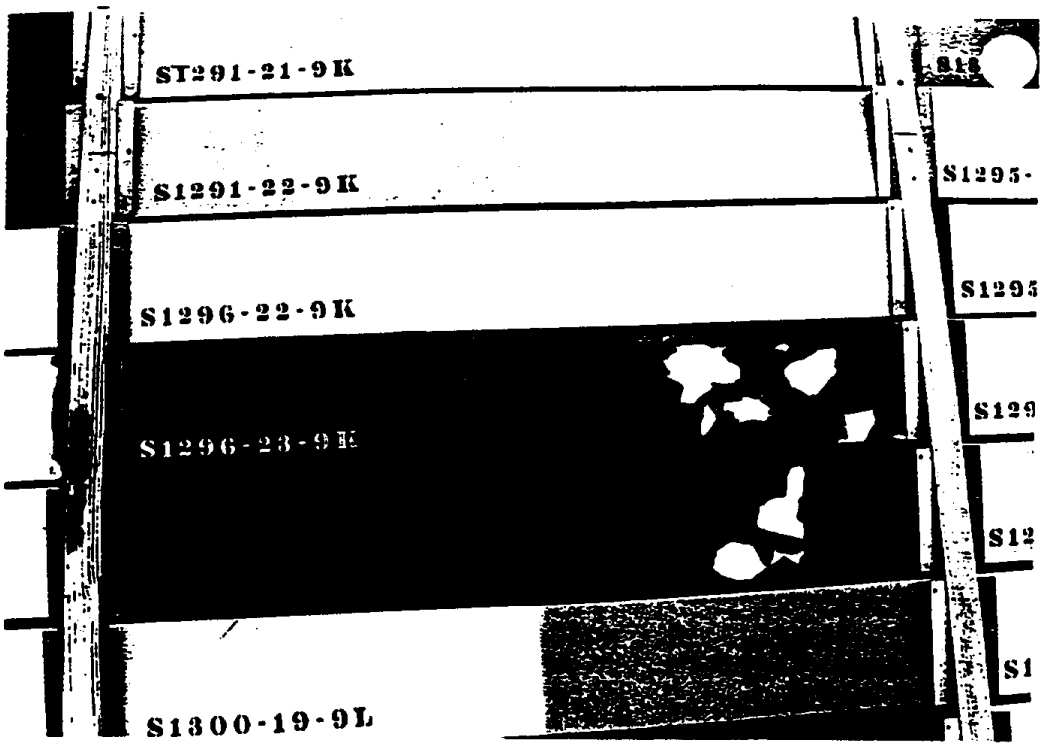
Description	VOC	Scrub Cycles		LTC*	Freeze-Thaw Cycles	60 Gloss
Acrylic Flat - 1 (Current)	102	270		pass	5	
	50	238	-11%	pass	0	
Acrylic/PVA Flat (Current)	92	326		pass	3	9
	50	258	-21%	pass	0	9
Acrylic Flat - 2 (Current)	140	282		pass	5	
	50	214	-24%	pass	0	
PVA Flat (Current)	96	393		pass	0	
	50	316	-20%	pass	0	
Acrylic Satin (Current)	119	388		pass	5	26
	50	308	-21%	pass	2	20
Acrylic/PVA Satin (Current)	102	125		pass	5	25
	50	100	-20%	pass	3	19
Acrylic Semi-Gloss (Current)	121	439		pass	5	45
	50	334	-24%	pass	3	27
Acrylic/PVA Semi-Gloss (Current)	124	182		pass	5	31
	50	167	-11%	pass	2	32
Int/Ext Gloss Enamel (Current)	203	1559		pass	5	75
(White)	150	1582		pass	5	74
	50	312	-80%	fail	0	73
Int/Ext Gloss Enamel (Current)	248	252		pass	5	71
(Black)	150	210		pass	0	79
	50	105	-58%	fail	0	74
Int/Ext Gloss Enamel (Current)	248	154		pass	5	77
(Red)	150	150		pass	5	77
	50	86	-44%	fail	0	73

* LTC = Low Temperature Coalescence

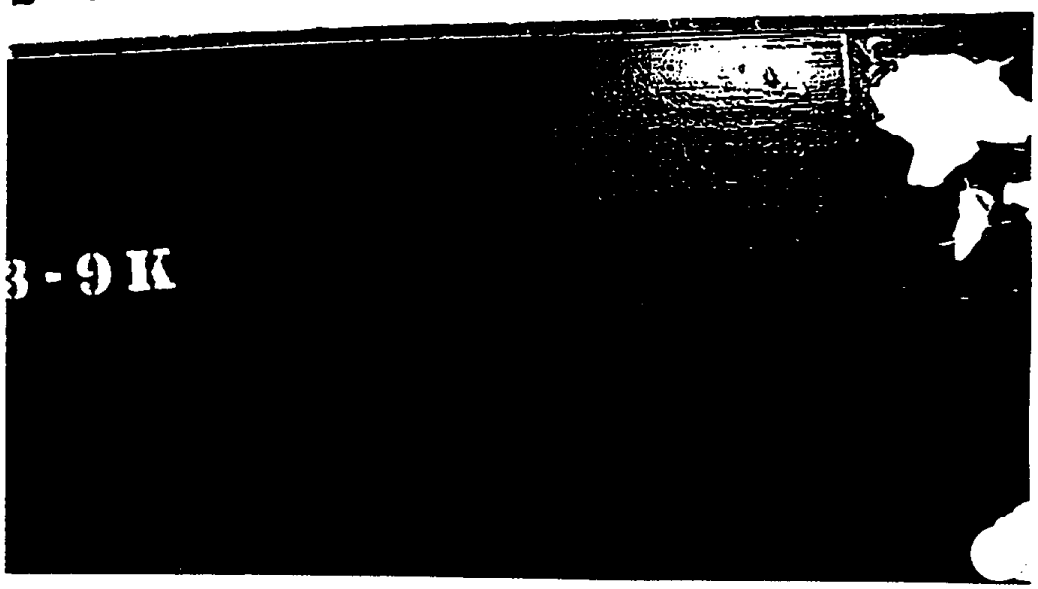
(1)

EXPOSURES ON MODERATELY CHALKY SUBSTRATE
9 Months exposure

White, Black and Red Int/Ext. Gloss Paints
LEFT OF PANEL = 248 VOC (211 VOC on white)
MIDDLE = 150 VOC
RIGHT = 50 VOC
BLISTERING AND LOSS OF ADHESION ON LOWER VOC PAINTS.



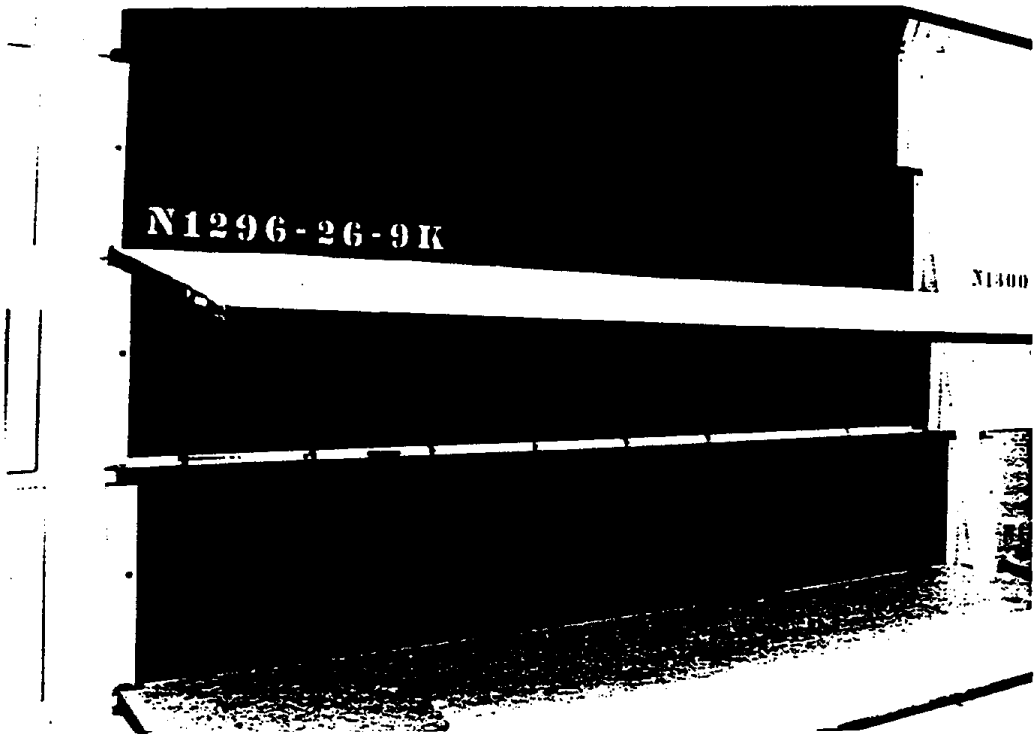
White shows problems but does not show on this close up. — see above photo



CLOSE-UP OF BLACK PANEL ABOVE, LEFT IS 248 VOC, MIDDLE IS 150 VOC, RIGHT IS 50 VOC.

CLOSE-UP OF RED.
LEFT = 248 VOC
MIDDLE = 150 VOC
RIGHT = 50 VOC
NOTE BLISTERS AND
ED SION LOSS.

UNDER EAVE EXPOSURE.



CLOSE-UP OF BLACK PANES.

248 VOC ON LEFT,
150 VOC IN MIDDLE
50 VOC ON RIGHT.

NOTE BLISTERS AND WRINKLING

Red panel shows the same but does not show on the pictures.

TEXTURED COATINGS OF AMERICA, INC.

CORPORATE OFFICES & EASTERN PLANT
2422 East 15th Street • Panama City, FL 32405-6348
(850) 769-0347 • FAX: (850) 913-8619 • www.TEXCOTE.com

SALES OFFICE
4101 Ravenswood Road Ste 105A
Ft. Lauderdale, FL 33312-5371
(954) 581-0771 • FAX: (954) 581-9516

WESTERN PLANT
5950 S. Avalon Blvd.
Los Angeles, CA 90003-1384
(323) 233-3111 • FAX: (323) 232-1071

FAXED 2/17/2000 Confirmed Receipt Kathy Spring

February 17, 2000

VIA E-mail jbrooks@arb.ca.gov and Facsimile (916) 327-6251 (without enclosures)
VIA Federal Express Overnight (with enclosures)

Ms. Janette Brooks
Stationary Source Division
California Air Resources Board
2020 "L" Street
Sacramento, CA 95812

RE: Waterproofing Concrete/Masonry Sealer Category

Dear Ms. Brooks:

I am president and CEO of Textured Coatings of America, Inc., (hereinafter "TCA"), a small national paint and coatings manufacturer having factories in California and Florida. TCA specializes in manufacturing high-performance concrete coating systems. TCA is beginning its 40th year in business as a company and has previously faced and had to deal with continued VOC regulations of this industry. I personally attended many of the South Coast's workshops held regarding Rule 1113. TCA's chief chemist, Kevin Worrall, has attended all of your workshops regarding your proposed Suggested Control Measures (hereinafter "SCM"). I also served as a small company representative during the entire regulatory negotiations for the federal AIM Rule.

2a-1 The California Air Resources Board (hereinafter "CARB") has consistently stated that they would follow the South Coast Air Quality Management District's (hereinafter "SCAQMD") Architectural Rule 1113. The most recent draft of the CARB's SCM dated February 11, 2000, indicates the deletion of the Waterproofing Concrete/Masonry Sealer Category. We are having trouble understanding why CARB would unilaterally delete this category since it is a category recognized in the SCAQMD's Architectural Rule 1113.

TCA believes that CARB should reinstate this category which was previously intact in its former draft of the Suggested Control Measures dated December 1, 1999. We believe that substantial justification can be shown why the Waterproofing Concrete/Masonry Sealer Category should remain intact at a VOC level of 400 grams per liter. TCA's concrete protective coating, XL-70® has significant technical justification to be considered in this category which was listed in your previous drafts of SCM's.

These arguments were made to SCAQMD who agreed with our position, and, in fact provided the enclosed letter whereby accepting TCA's XL-70® product line as a Waterproofing Concrete/Masonry Sealer. Also enclosed are TCA's chief chemist's comments relative to his

technical justifications of TCA's XL-70® product line falling into the Waterproofing Concrete/Masonry Sealer Category.

2a-1 TCA has repeatedly reformulated its XL-70® product line to its lowest possible VOC limit. To reduce it below a limit of 400 grams per liter would result in the elimination of the entire product line. TCA's XL-70® product line is unique and provides protection and beauty to thousands of concrete structures throughout California. TCA's XL-70® product is a high-performance product, which require virtually no maintenance. Consequently, the total amount of VOC emissions with XL-70® are significantly lower versus the use of other lower-performing products which require repeated coating and maintenance thereby emitting greater VOC levels over time.

2a-2 TCA currently employs 65 people. In addition, there are hundreds of people who make their living selling and apply these products. If the Waterproofing/Concrete Masonry Sealer Category were eliminated, one of the outcomes for TCA would be to close its Los Angeles factory and re-locate it outside of the state of California. This could be economically and socially devastating for many of our employees, some who have been with TCA in excess of 30 years or more and whose livelihoods depend on the operation of this factory.

As TCA's president and CEO, I respectfully request CARB to reconsider its tentative decision to eliminate the Waterproofing/Concrete Masonry Sealer Category. I also request immediate feedback from CARB if it will consider this request to re-open this category so TCA can determine what the next course of action should be to ensure this category and VOC limit remain intact. Please feel free to contact me at (800) 454-0340, extension 248 if you have any questions.

I look forward to your response.

Respectfully,

Jay A. Haines
President/CEO

Enclosures: SCAQMD's May 5, 1999 Correspondence
Kevin Worrall, Chief Chemist for TCA's Comments on XL-70®
(Various testing data reports)

TEXTURED COATINGS OF AMERICA, INC.

CORPORATE OFFICES & EASTERN PLANT
2422 East 15th Street • Panama City, FL 32405-6348
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FAXED 2/17/2000 Receipt by Kathy Spring

February 17, 2000

Via E-mail jbrooks@arb.ca.gov and Facsimile (916) 327-6251 (without enclosures)
Via Federal Express Overnight (with enclosures)

Ms. Janette Brooks
Stationary Source Division
California Air Resources Board
2020 L Street
Sacramento, CA 95812

Subject: Waterproofing Concrete/Masonry Sealer Category

Dear Ms. Brooks,

I would like to introduce myself. My name is Kevin Worrall Chief Chemist for Textured Coatings of America and have been employed as such for over 28 years.

During my tenure, a major product line was developed for water proofing concrete and masonry namely Tex-Cote XL-70® Concrete Protective Coatings. It is my wish to provide you with extensive supporting data relative to Textured Coating of America's XL-70® product line. These products should be classified as ***Water Proofing*** Concrete Masonry Sealers with a maximum V.O.C. of 400 grams per liter.

The formulated design for XL-70® utilizes a chemical system based on a vinyl acrylic toluene copolymer resin in mineral spirits which provides its ability for application directly over old or new damp (green) concrete. 2a-1

In today's market it is being used as a primerless system for concrete Tilt-ups, poured in place concrete, cement masonry, blocks, bricks, and various mineral substrates.

Tex-Cote XL-70® has extensive compatibility with form oils and release agents, which are present as surface residues in formed concrete. Lower V.O.C. products cannot penetrate such residues for adhesion, and are prone to failure such as extensive peeling and color irregularities.

Because Tex-Cote XL-70® is a high build one coat primerless application it will provide an average of 16 mils dry film when applied at our specification of 50 square feet per gallon.

This thick film will protect concrete and similar cement based substrates for 20 years or more from **water penetration**, freezing conditions, abrasion, as well as hide numerous imperfections on formed concrete such as "worm holes or small cracks." It is specified by Department of Transportations, architects and military all over America.

In order to substantiate the uniqueness of Tex-Cote XL-70® Concrete Protective Coating, a survey was conducted by Ron Joseph & Associates Coating Consultants.

Mr. Joseph had interviews conducted with technical staff of P.P.G Industries, Tnemec Co., Ameron Protective Coatings, Carbolone Co, Cook Paint and Varnish, Porter Coatings, & Reliance universal to determine if there existed a low V.O.C. solvent based vinyl type coating with performance properties of Tex-Cote XL-70® Coating.

2a-1 The conclusion was not one of these companies had a concrete protective coating with low V.O.C. having all the properties of Tex-Cote XL-70® Coating.

What is important to realize is that concrete used for bridges, support columns, Tilt-ups, and poured in place construction are all reinforced with steel rebars. In order to protect these rebars from **water penetration**, salt and atmosphere chemical intrusion, it becomes vital to protect the concrete substrate with the appropriate weather proofing system. Tex-Cote XL-70 will provide this protection.

I have repeatedly reformulated the XL-70® product line to its lowest V.O.C. limit possible. To reduce it past a limit of 400 grams per liter would mean the elimination of the entire XL-70® product line.

The above mentioned performance properties are a major function of Tex-Cote XL-70® products and in order to provide supporting data I have included a package of independent laboratory reports as follows:

(1.) Federal specifications TTC 555B – Passes
(2.) 10,136 hours Weatherometer – (This is approximately 28 years)
(3.) Freeze thaw – 378 passes
(4.) Salt spray ASTM B-117 – 3024 Hours no adhesion loss
(5.) Fungus test TTP-29 (21 day incubation) Passed
(6.) Tex-Cote XL-70® Infra Red Spectrum – for identification
(7.) Abrasion test ASTM D968-81 – 2,500 liter sand passed
(8.) Fire test ASTM E84 – Class A NFPA – Passed
(9.) Resistance to 98 miles/hr wind driven rain. TTC 555B – Passed
(10.) Accelerated alkali resistance – Resistance to 5% sodium
Per Federal Specification TTC 555B Exception #1 — Hydroxide at 120° F for 16 hours Passed
(11.) Tex-Cote XL-70® C Bridge Cote® – Passed Federal Specification TTC 555B and (Concrete Curing Compound Concrete) — AASHTO M 148 and T – 155 (Same as ASTM C 156-74)

Be advised that there is another XL-70® Concrete Protective Coating namely – "Tex-Cote XL-70® Bridge Cote® with Silane & XL 70® Roll-on with Silane."

These two products are essentially the same basic formula for Tex-Cote XL-70® but modified with a silane water repellent and provide additional protection.

The test reports listed for these products are as follows:

(1.) XL-70® Roll-on with silane - 400 hrs Weatherometer test per Federal Specification TTC 555B. Passed at 80 and 40 square feet per gallon.
(2.) XL-70® Bridge Cote® with Silane – Fungus test TTP 29 with 21 day incubation. Passed
2a-1 (3.) XL-70® Bridge Cote® with Silane – Permeability – Passed per ASTM E 96.
(4.) XL-70® Bridge Cote® with Silane – Chloride ion penetration AASHTO T-258-80 & ASHTO T 260-84 Passed.
(5.) XL-70® Bridge Cote® with Silane – Salt spray test ASTMB117 300 hrs Passed.
(6.) Xl-70® Bridge Cote® with Silane Scale Resistance – Tested for 50 cycles ASTM C672-91. Passed
(7.) XL-70® Bridge Cote® with Silane Weatherometer – Tested per Federal test TTC 555B for 400 hrs. – Passed
(8.) XL-70® Bridge Cote® with Silane Freeze Thaw – 100 cycles per Mississippi standard specifications (Section 714.12) Passed 100 cycles
(9.) XL-70® Bridge Cote® with Silane – Water absorption test ASTMC642 reduced water penetration in hardened concrete by 50%.
(10.) XL-70® Bridge Cote® Silane – NCHRP 244 series IV accelerated weathering (Southern Climate) reduction of chloride ion penetration. Passed

In conclusion, we believe that the role of Tex-Cote XL–70® for water proofing concrete and masonry is extremely important and should be available to the industry to provide the necessary protection. To help achieve this, a V.O.C. limit of 400 grams per liter must be maintained and we respectfully request that Tex-Cote XL-70® be classified as a water proofing sealer for concrete and masonry.

Thank you,

Kevin Worrall
Chief Chemist
Textured Coatings of America, Inc.

KW/ct

South Coast
Air Quality Management District
21865 E. Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • http://www.aqmd.gov

May 5, 1999

Mr. Jay A. Haines
President/CEO
Texture Coating of America, Inc.
Corporate Office & Eastern Plant
2422 East 15th Street
Panama City, Florida 32405-6348

Dear Mr. Haines:

This letter is to provide you with a response regarding the Tex-Cote XL-70® coating and its classification under Rule 1113 – Architectural Coatings.

My staff has reviewed all of the information your company submitted on this coating and has concluded that Tex-Cote XL-70® is classifiable under Rule 1113 as a Waterproofing Concrete/Masonry Sealer. This category has an existing volatile organic compound (VOC) limit of 400 grams per liter (less water and exempt solvent), and is not affected by the amendments to be considered by the South Coast Air Quality Management District's Governing Board on May 14, 1999.

If you have any additional questions regarding this letter, please contact Mr. Naveen Berry at (909) 396-2363.

Sincerely,

Jack P. Broadbent
Deputy Executive Officer
Planning, Rule Development, and Area Sources

RECEIVED
MAY 11 1999
BY

cc: Naveen Berry
Kevin Worrall, Texture Coatings of America, Inc.

TEXTURED COATINGS OF AMERICA, INC.

CORPORATE OFFICES & EASTERN PLANT
2423 East 15th Street • Panama City, FL 32405-6348
(850) 769-0347 • FAX: (850) 913-6619 • www.TEXCOTE.com

SALES OFFICE
4101 Ravenswood Road Ste 105A
Ft. Lauderdale, FL 33312-5371
(954) 581-0771 • FAX: (954) 581-9516

WESTERN PLANT
5950 S. Avalon Blvd.
Los Angeles, CA 90003-1364
(323) 233-3111 • FAX: (323) 232-1[illegible]

April 6, 2000

VIA E-mail jbrooks@arb.ca.gov
VIA Facsimile (916) 327-6251
VIA Federal Express Overnight

Ms. Janette Brooks
Stationary Source Division
California Air Resources Board
2020 "L" Street
Sacramento, CA 95812

RE: Concrete Protective Coatings Category

Dear Ms. Brooks:

It was a pleasure speaking to you and your staff by telephone on March 20, 2000. I appreciate the time and consideration you have given to my company's request for the California Air Resources Board (CARB) to adopt the Concrete Protective Coatings Category as specified under the Federal Architectural Industrial Maintenance Coatings Rule. We believe the best and most reasonable decision would be to incorporate the Federal Concrete Protective Category at a VOC of 400 grams per liter in CARB's Suggested Control Measure.

I hope CARB realizes the significant contribution Textured Coatings of America, Inc.'s (hereinafter "TCA") XL-70® product line provides in a maintenance-free primer-less coating system to the State of California. We believe we have shown technical justification of our XL-70® product to substantiate this category. In fact, your agency has been provided with independent laboratory testing showing XL-70® products have a longevity in excess of 25 years. Even the South Coast Air Quality Management District has agreed with TCA as shown in their letter we provided to you in our February 17, 2000 correspondence. TCA has repeatedly reformulated its XL-70® product line to its lowest possible VOC limit. To reduce the Waterproofing Sealer Category to 250 grams per liter and not implement the Concrete Protective Coatings Category would be disastrous for both TCA and the State of California. This would mean eliminating a proven high performance primer-less coating system, which is maintenance free; the elimination of TCA's main product line; closing of TCA's West Coast factory; and unemployment of many California residents whose source of livelihood is the sale of TCA's products.

2b-1

2b-1 As TCA's president and CEO, I respectfully request CARB to implement this category at a VOC of 400 grams per liter. Even though you have said it is not necessary for TCA to supply any further data, testing, etc. on our XL-70® product, we will be glad to comply with any further requests, if necessary. If I can be of any assistance, please feel free to contact me at (800) 454-0340, extension 248.

Respectfully,

Jay A. Hames
President/CEO

JAH/sam

MONTEREY BAY
Unified Air Pollution Control District
serving Monterey, San Benito, and Santa Cruz counties

AIR POLLUTION CONTROL OFFICER
Douglas Quetin

24580 Silver Cloud Court • Monterey, California 93940 • 408/647-9411 • FAX 408/647-8501

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Monterey County

February 25, 2000

Jim Nyarady
Manager
Strategy Evaluation Section
Stationary Source Division
P.O. Box 2815
Sacramento, CA 95812

SUBJECT: DEIR FOR SUGGESTED CONTROL MEASURE FOR ARCHITECTURAL COATINGS

Dear Mr. Nyarady:

Staff has reviewed the referenced document and has the following comments:

1. Page IV-60. Reference is made to the significance thresholds of the SCAQMD has being the most conservative. Attached for your information, are thresholds of various districts based on a survey undertaken for the CAPCOA Planning Managers in 1998 which shows several districts with lower thresholds. 3-1

2. ARB staff should be commended for preparing a very thorough and comprehensive environmental document. It will be an invaluable reference for districts subsequently adopting the SCM. 3-2

Thank you for the opportunity to review the document. Please do not hesitate to call if you have any questions.

Sincerely,

Janet Brennan
Supervising Planner
Planning and Air Monitoring Division

Enc.

THRESHOLDS OF SIGNIFICANCE - OPERATIONAL EMISSIONS (LB/DAY) [1]

District	ROG	NO_x	PM_{10}	CO	Odor	Toxics	Cumulative
Amador Area Source (per acre) Line Source Combustion Point Source Non-combustion Pt. Source	 34 550 550 24.2	 17 347.9 365.4 none	 6.4 130.5 137 7.3	485.1			
BAAQMD	80	80	80	550 or affects LOS or traffic volumes	Screening Table	Carcinogens-10 in 1 million Non-carinogen - > than 1 for MEI	Individual projects > thresholds. Projects below levels-consistency with GP & AQP.
Butte Co. APCD Level A (standard MMs) Level B (supplemental MMs) Level C (supplemental MMs)	 ≤25 >25 >137	 ≤25 >25 >137	 ≤80 >80 >137				
Calaveras Co. APCD*	550	—	—				
Colusa Co.APCD	25	25	80				
El Dorado Co. APCD*	10	10	80				
Feather River AQMD	25	25	80				
Glenn County APCD	25	25	80	550			
Great Basin Unified APCD	none	none	none			Cancer risk >10 in 1 million	
Kern County APCD	137	137	—			Health risk public levels	Consistency with AQP
Lake County APCD	—	—	—				
Lassen County APCD*	25	—	—				
Mariposa County APCD	—	—	—				
Mendocino County APCD*	220	220	80				
Modoc County	—	—	—				
Mojave Desert AQMD*	137	137	82				
Monterey Bay Unified APCD	150	150	82	550 or affects LOS or traffic volumes triggering modeling		Rule 1000 Thresholds	Consistency with AQMP

District	ROG	NO_x	PM_{10}	CO	Odor	Toxics	Cumulative
North Coast Unified APCD*	220	—	—				
Northern Sierra AQMD	137	137	137				
Northern Sonoma APCD*	220	—	—				
Placer County APCD	82	82	82	82			Individual projects above threshold; consistency with pop. forecasts in AQP
Sacramento Metro. AQMD	85	85	275				Projects requiring a land use change with increased emissions over existing land use
San Diego County APCD	none	none	none				
San Joaquin Valley UAQMD	10 t/y	10 t/y	None Meet Reg. VII	Modeling	Screening Table	Increases cancer risk with maximum exposure by 10 in 1 million. Non-cancer Hazard Index >1	
San Luis Obispo Co. APCD Tier 1 (On-site MMs) Tier 2 (All feasible MMs)	 10-24 ≥25	 10-24 ≥25	 10-24 ≥25	 550 modeling required			
Santa Barbara Co. APCD All project sources Mobile sources only	 240 25	 240 25	 80 25				Consistency with AQP and AQ Supplment of Co. GP
Shasta Co. AQMD	25	25	80				
Siskiyou Co. AQMD	—	—	—				
South Coast AQMD	55	55	150 or 2.5 ug/m_3 - 24-hr	550 or 1.1 mg/m^3 = 1.0 ppm (1-hr. average)	Creates an objectionable odor > 10 D/T	MICR≥10 in 1 million HI≥ 1.0 (project increment) HI≥ 5.0 (facilitywide)	
Tehama Co. APCD*	137	137	137				
Tuolumne Co. APCD	100 t/y	100 t/y	—				
Ventura Co. APCD Ojai Valley Rest of County	 5 25	 5 25	—				Projects with emissions >2 lbs/day- consistency w/ AQMP. GP Amend - consist w/ AQMP
Yolo-Solano AQMD	82	82	82	550			

(1) Thresholds were provided to MBUAPCD by districts unless indicated by a *. These (*) thresholds are from a Draft Survey prepared by Sacramento Metropolitan AQMD. October 1998.

February 28, 2000

Ms. Janette Brooks
Stationary Source Division
California Air Resources Board
2020 L Street
Sacramento, CA 95812

Subject: Hearing on March 16, 2000

Dear Ms. Janette:

Thanks for recently posting the March 16 meeting schedule and the agenda for the meeting.

In reviewing the schedule and the meeting agenda, it is clear to us that a full day's meeting is required in order to even begin to cover the information that is specified in the agenda.

4a-1 Additionally, the meeting should be devoted to discussions of the findings that are in the draft EIR document, especially the coatings technology and cost of reformulation issues. The averaging issue should be reserved for another meeting.

The key issues that require detailed review and discussion between staff and the industry at this time are the technology and costs issues that are raised by the proposed limits in the SCM. I have included with this communication a letter to you concerning the EIR's discussion of the technology required for the waterproofing concrete/masonry sealer category of coatings which gives an idea of the kinds of technology discussions that we believe are needed between staff and industry in an open session in order to ensure that the staff has a better understanding of the all-important technology and cost issues involved here.

I understand that a number of coatings manufacturers have responded to the cost survey that was sent by CARB. In our follow-up on this we found that a number of coatings manufacturers had not received it and we put them in touch with where they could obtain another copy. I assume that some may still be

4a-2 responding even as we go to the meeting on March 16. But undoubtedly some of the new information will be available for the meeting. Thus, the meeting on the 16th will offer an important opportunity for a more comprehensive discussion of technology and costs issues to be undertaken than what has occurred heretofore. The kind of discussions we will undertake will include discussions of feasible technology and specific reasons why the staff agrees or disagrees with these discussions.

The communication I am sending to you concerning the waterproofing concrete/masonry sealer category of coatings is a good example of what could be a basis for discussion. Staff may have sound reasons for its selection of the technology it recommends for this coating that adequately answer the submission of Textured Coatings of America. But if so, they are not found in the EIR document. Nor are they evidenced in the article that the staff cites in support of its decision, an article which actually supports Textured Coatings' position. Similarly, in our last telephone conference, the Sherwin Williams representative raised questions about the basis of staff's conclusion that since two pack systems are available in hardware stores, industry's concerns about their safe handling by non-professionals are misplaced. The Sherwin Williams representative asked for specifics about the type of two pack systems staff had found to be available for non-professional homeowners to use, pointing out that none are sold be her company, one of the largest paint companies in the United States. There was no answer to her question.

4a-3

Again, I emphasize that the purpose of an SCM is to identify best available retrofit control technology in order to reduce extensive fact finding by the districts when they go to adopt such technology in formal rulemakings. It is in everyone's interest that the SCM be factual based and not "pie in the sky" hopes. The only way this will occur is if industry and staff have frank exchanges in some detail about what is feasible and why.

4a-4

With the above in mind, I request that a full day be devoted to the May 16 hearing.

Sincerely,

Jim Sell
Senior Counsel

February 28. 2000

Ms. Janette Brooks
Stationary Source Division
California Air Resources Board
2020 L Street
Sacramento, CA 95812

Received
2000
A.Q.M. Branch
SSD

National Paint & Coatings Association

Subject: Waterproofing Concrete/Masonry Sealer Category

Dear Ms. Brooks:

4a-5 I have attached the submissions of Textured Coatings of America. I am writing to let you know that the National Paint and Coatings Association fully endorses the statements made in the submissions.

As you know from our previous conversations, the SCM development process to date has concerned us. In particular, we have had the impression that the staff has not adequately considered the technical information that has been provided by our industry, both in oral presentations in public and private meetings and telephone conferences and in written submissions.

4a-6 Staff has not engaged in the type of dialogue with the submitters of the information that would indicate a genuine interest in determining what VOC limits are technologically and economically feasible to justify their being specified in the SCM. Instead staff has declined to engage in any discussions of specific performance characteristics of coatings with industry representatives, except by way of general statements such as "We believe that the limits are technically feasible."

The attached submissions from Textured Coatings of America are representative of the type of information staff has not responded to in any detail. These submissions are detailed, technically sound, and merit a detailed response from staff.

During the course of our discussions when we have raised concerns about lack of meaningful responses from staff concerning the technical information that was being provided, or the continued inclusion of what we believed to be unjustifiably low VOC limits in the draft SCM, we were informed to wait for the publication of the EIR publication where the technology rationales of the staff for selecting the limits would be presented.

4a-7 The EIR document is a disappointment in this respect as evidenced in its treatment of the technology at issue here -- waterproofing sealers for concrete coatings. The EIR's discussion of this issue is found at page 186 of the document under the heading of Concrete Protective Coatings. Additionally, the

EIR document contains a table of various low VOC coatings for water proofing sealers both wood and concrete. Table E-24. None of this information adequately responds to the chief technical point made in the attached submissions from Textured Coatings -- i.e., the lower VOC coatings do not have

4a-7 all of the important properties of Tex-Cote XL-70® Coating. Nor does the information in any way justify a conclusion that such lower VOC coatings will be technologically and economically feasible when the proposed limits become effective.

In fact, the 1996 Paint and Coatings Industry magazine article cited and quoted by the staff in its discussion of Concrete Protective Coatings contains information which substantiates the points made by Textured Coatings. It is striking and disturbing that the staff does not address the reservations expressed in the article about using low VOC coatings on concrete while at the same time quoting it for general information about the performance requirements that are needed for concrete substrates.

A few quotes from the article demonstrate why we are concerned about whether the staff has sufficient information to reach its general conclusion that the higher VOC coatings can be adequately replaced by lower VOC coatings in the case of

4a-8 concrete protective coatings.

The article identifies two types of waterborne coatings--1) zero-VOC waterborne siliconates; and 2) linear siloxane polymers.

With respect to zero-VOC waterborne siliconates, the article warns against applying them to concrete:

> "Siliconates should not be applied to highly alkaline substrates, such as **concrete**, because neutralization does not readily occur to form the polymer network necessary for performance." (Emphasis added.) (At p. 86 of article.)

With respect to linear siloxane polymers, the following drawbacks are noted for application to alkaline substrates (like concrete):

> Unfortunately they also reduce alkaline resistance, while increasing the dirt pick up, slip and recoatability problems." (At p. 86 of article.)

Finally, this general point is made at the end of the article concerning the continuing need for solvent borne systems for alkaline substrates:

"For more alkaline substrates [like concrete], products containing long-chain alkyl groups [solventborne systems] are required for long term performance." (At p. 88 of article.)

4a-8 We hope that these sorts of issues from the article will be addressed with specificity in our future meetings. It is puzzling why they were not raised and discussed in the EIR report in the first place when other aspects of the article were extensively quoted by staff.

4a-9 At the end of the day, an SCM is suppose to serve the purpose of identifying available technology so that the individual districts do not feel compelled to reexamine the recommended technologies. This would seem to require that the drawbacks of lower VOC coatings for particular applications be examined and discussed as thoroughly as conclusions that the coatings are technologically feasible.

4a-10 In conclusion, we request that the Waterproofing Concrete/Masonry Sealer coatings category that was recognized in the December 1, 1999 draft SCM be restored at its originally proposed limit of 400 grams per liter. In addition to the technical points raised in this letter and the attached submissions from Textured Coatings of America, I want to emphasize that even the SCAQMD determined that 400 grams of VOC per liter of coating is necessary for this coating. Moreover, the limit of 400 grams per liter for this coatings category is the lowest established under any regulation in the United States. It is impossible for me to understand how on the evidence in public record, including points made by the technical article cited by staff for its decision, that the staff could reject the May 14, 1999 decision of the SCAQMD staff that a minimum of 400 grams of VOC per liter of coating is necessary for the coating to perform adequately.

Sincerely,

Jim Sell
Senior Counsel

Comment Letter 4a

The commenter attached two letters from Textured Coatings of America. They are identical to Comment Letter #2a (Textured Coatings of America) of the Final Program EIR.

[illegible] Mineral-Based Construction Materials

A [illegible] are used [illegible] based ma[illegible] the use[illegible] sing the [illegible] logy ma[illegible] sis.

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A wide range of construction technologies use mineral-based materials to build long-lasting, durable office buildings, factories, roads and homes. Traditional building products, as well as new, innovative offerings using concrete, cement-bonded materials, stuccos, exterior insulation and finishing systems products, bricks and mortars, ceramics, gypsum compositions, roofing products, and natural stones, are used in the construction market.

Until a few years ago, most of these products were believed to be fairly resistant to aggressive substances in the environment, but examples of degradation have been found to be more prevalent than originally thought. America's roads and bridge decks are under constant repair to retain their strength and safety for motorists. Masonry buildings require tuck pointing, as well as cleaning and replacing complete sections in cases where spalling and structural integrity are lost.

Sidewalks and driveways crack. Commercial-building facades also effloresce and crack, which leads to costly repairs. In the most extreme cases, the buildings are torn down. Homeowners repaint block walls discolored from dirt and biological growth, replace rotting plywood not protected by mineral-based finishes and fix cracked driveways.

History has shown that for every 100 buildings, 24 are damaged in the first year, 15 in the second, seven in the third, six in the fourth and three in the fifth. This means that 55% of all buildings are damaged within five years. The annual cost of this damage can run into the billion-dollar range.

Water Intrusion Causes Degradation

Aside from abrasion, virtually all degradation involves water. Mineral construction materials can, by virtue of their pore structures, absorb water through their capillaries. Water enters not only through exterior facades, but also by the humidity within buildings, by groundwater and by penetration through cracks, seams and joints. As a result, film-forming surface coatings cannot keep water out completely and can even trap it within the construction materials. This results in absorbed water that often carries harmful substances, enters mineral-construction materials and causes degradation through mechanical-, chemical- and biological-based mechanisms.

Water itself causes freeze/thaw damage. In many construction materials, this can be reduced or eliminated by using air entrainment; however, where this is not possible or desired, other technologies are required. Water can also carry dirt, which can require expensive cleaning and coating applications to restore the appearance of the construction materials (see Figure 1).

Substances dissolved in water, especially chloride compounds (from road salt), are much more deleterious than freeze/thaw effects. Both chloride and sulfate ions carried by water chemically cause expansive forces that degrade rebar- and lime-containing construction materials. For example, the high alkalinity of new concrete protects steel rebars against corrosion, but as concrete ages, carbonation occurs, and the alkalinity of concrete is lowered. Alkaline protection is lost and water-carrying chloride ions penetrate, causing steel to corrode.

When steel corrodes, its volume increases by a factor of 2.5, giving rise to forces that a thin concrete covering cannot withstand. These expansive forces are also created when acid rain interacts with concrete and forms higher-volume calcium sulfate from calcium carbonate. This causes the concrete to spall. Protecting construction materials, therefore, always means protecting them against chemical sources of degradation (see Figure 2).

Water in construction materials supports biological growth that degrades mineral-based materials. Insects bore into construction materials causing degradation, and fungi penetrate into pore structures, reducing structural integrity and causing darkening often mistaken for dirt (see Figure 3).

Protective Technologies

Coatings and sealers cannot make up for poor construction. Nonetheless, they clearly play a major role in extending the useful life of many structures. While coatings often contribute a small fraction of the total construction cost, their performance is crucial to service life. This is especially true in construction markets in which a wide variety of sealers are used to protect mineral-based materials.

Continuous Sealers (Film-Forming Sealers)

Continuous sealers protect building materials by forming a complete barrier that stops water intrusion. However, as a result of their continuous films, they are typically resistant to gas permeation. While this resistance can be desirable for some applications, vapor transmission is beneficial for long-term sealer and substrate performance in other applications.

Water absorbed by materials coated with continuous sealers cannot escape, and moisture becomes trapped beneath the sealers. When this occurs, both hydrostatic and vapor pressures might exceed the adhesive strength of the film, which results in cracking and blistering. This coating failure leaves the substrate unprotected and requires recoating. Continuous seals also inhibit carbonation, which is essential for hardening and strengthening cementitous materials (see Figure 4).

Discontinuous Sealers (Impregnating Sealers)

Discontinuous sealers protect building materials from water intrusion, but some of them also allow water absorbed into construction materials to escape. Additionally, where vapor permeability is retained, carbonation is allowed to continue strengthening building materials over time.

Many classic, nonsilicone, impregnating sealers based on wax, stearate and silicate technologies are not vapor-permeable, since they physically fill pore structures to repel water. Where a complete sealer is desired that resists both water and vapor transmission, these materials can work very well. In most above-ground applications, however, it is desirable to use long-lasting, vapor-permeable technologies and products.

Silicone Discontinuous Sealers

For several decades, silicones have been revolutionizing the approach to construction-material protection. Water damage can effectively be prevented with silicones by treating the mineral substrates. Silicones, although best known for their hydrophobic properties, are also resistant to UV light, microbes and weathering, resulting in long-lasting performance.

How can silicones repel water so effectively and yet manage to remain permeable to water vapor? To use an analogy, they function like leaves do in nature. Leaves hold water at bay, allowing it to run off the surface, but they can also exchange gases with the environment.

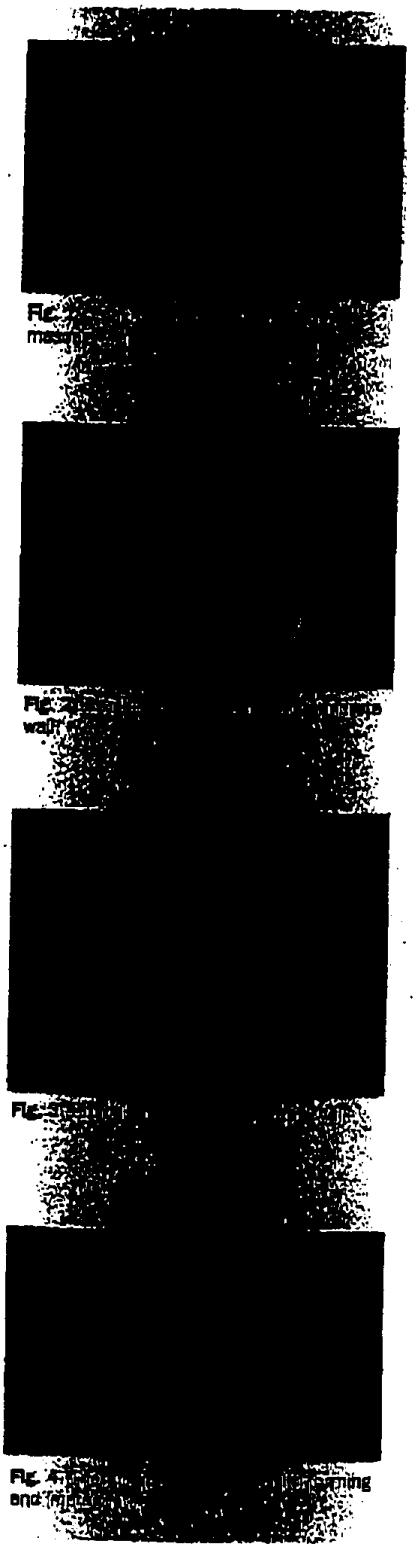
Silicones owe this property to their molecular structure. Chemically, they range between organic and inorganic compounds, with each molecule having an inorganic backbone that resembles quartz (SiO_2) in structure, to which are attached organic groups, denoted by R-. Thus, the molecules have a highly specific spatial structure. They align themselves on the building materials with their inorganic backbones (-SiO-) against the surface and the organic groups (R-) projecting outwards to present a barrier to moisture and render themselves water-repellent and nonwettable. The silicone molecules, however, do not fill the pores of the substrates, so the surface retains its permeability to water vapor and breathes. Treated buildings do not suffer from condensation damage (see Figure 5).

Because silicones do not fill the pores, the water-repellency effect can be overcome by hydrostatic pressure. For this reason, they are not used for sealing foundations, but are applied to vertical and steep surfaces. Building materials also impregnated with silicones absorb very little water and can readily release it again in dried conditions.

Another characteristic of some silicone sealers is that they are solvent-free. Since the only volatile organic compounds (VOCs) come from the alkoxy groups that hydrolyze to form alcohols during curing, these sealers are environmentally friendly. Their VOCs are typically less than 300 g/l when measured using ASTM D 5095 and Environmental Protection Agency Method 24.

Silicone Sealer Composition and Performance

A wide range of silicones with a variety of compositions, properties and performance characteristics are used to protect mineral-based materials. Depending on the end-user's requirements, choosing the correct silicone technology for a specific application requires some analysis.



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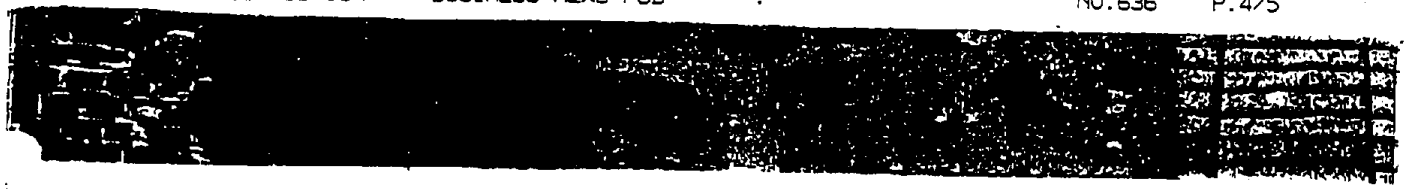


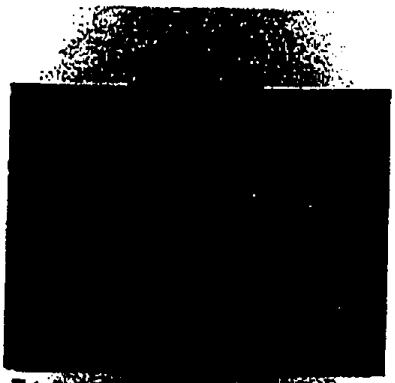


Fig. 2: [illegible] seals water[illegible]

Fig. 3: [illegible] water-borne [illegible]

Fig. 4: [illegible] treated on a rain[illegible] (light[illegible])

Siliconates

Siliconates are zero-VOC, waterborne products that work well on porous, neutral substrates where adequate control over their application is used to avoid excess carbonate salt formation. They cure by a different mechanism than silanes and siloxanes, using a neutralization reaction that relies on carbon dioxide in the air.

Siliconates should not be applied to highly alkaline substrates, such as concrete, because neutralization does not readily occur to form the polymer network necessary for performance. This is not a problem on neutral substrates, including clay products, where neutralization can easily occur.

When siliconates cure, carbonate salt byproducts, usually potassium or sodium carbonates, are formed. These white salts can be difficult to remove from dense substrates, particularly if the siliconate is over-applied. On porous substrates, the salts are carried into the substrate and are not seen, even with over-application.

Siliconates provide long-term protection for neutral, porous, mineral-based construction materials. Since they are highly caustic and prone to over-application, siliconates should be used in situations in which trained personnel can apply them.

Linear Silicones

Linear siloxane polymers (dimethylsiloxanes) are widely used in several applications, including textile treatments, automobile polishes and sealants. Recently, they have been formulated into penetrating sealers and pigmented coatings for mineral substrates that help lower costs and provide elastomeric properties. Unfortunately, they also reduce alkaline resistance, while increasing dirt pick up, slip and recoatability problems.

When formulated properly, crosslinking silanes and siloxanes provide water-repellent, vapor-permeable sealers without the problems mentioned with linear siloxane polymers. In fact, they are often used as primers and increase adhesion between paint and mineral substrates.

Relatively neutral-pH, crosslinking silanes and low-molecular-weight siloxanes cure by hydrolysis and condensation on both neutral and highly alkaline substrates to form water-repellent sealers. Since water is necessary for curing, surfaces should be prewetted in low-humidity environments.

Silicone-based, water-repellent penetration can generally be explained by thinking of the substrate as a highly polar stationary phase in column chromatography. Not surprisingly, the polarity of the solvent used to deliver silicones has a strong influence on penetration. Silicones penetrate more deeply in nonpolar mineral spirits than in the more polar alcohols or in water. Smaller molecular size and lower viscosity also promote increased penetration, as demonstrated by the depths of penetration achievable using silanes. Highly polar waterborne siliconates do not penetrate as well as silanes and solvent-based products on highly polar substrates such as concrete.

While deep penetration is often considered an advantage, it should be understood within the context of the desired performance. Where a significant amount of abrasion is expected, as in Department of Transportation applications, high penetration is needed. However, in cases such as commercial-facade protection and most DIY applications, high penetration is not needed or desired. In these areas, it is costly to treat substrates to depths that are not needed for protection.

Siloxanes are known to penetrate well into mineral substrates, but not as well as silanes due to their higher molecular weight and viscosity. At the same time, they have higher vapor pressures and do not volatilize readily. This is demonstrated in typical applications in which silanes are used at much higher use levels (20% to 100%) than siloxanes (5% to 20%).

Since siloxane-based products remain on treated surfaces and do not readily volatilize, greater care needs to be taken during their application because applying too much material can cause darkening. Silanes, on the other hand, show a higher tendency to evaporate from substrate surfaces, so even 100%-active materials can be used without causing darkening problems. Since these products are designed to leave substrate appearances unchanged, attention should be paid to darkening propensity when selecting a silicone-based sealer.

Some products are formulated using blends of silanes and siloxanes to achieve both increased depth of penetration and low use levels. This provides cost-effective products with penetration that is suitable for most applications.

Formulation Variables

Of course, a variety of different formulated silanes and siloxanes exist in the marketplace. How are they different? Aside from the alkoxyl functionality differences mentioned earlier, silanes and siloxane formulations contain different types of alkyl (R-) groups, which affect performance. The presence or lack of catalysts, strengthening agents, amino-functional silicones and surfactants also affects performance.

Generally, methoxy- or ethoxy-functional silanes and siloxanes release methanol or ethanol on curing. Methoxy-functional silicones cure more quickly than ethoxy-functional silicones and leave more active silicone resin on substrates by weight because methoxy groups are of lower molecular weight after curing than ethoxy groups (15 g/mol versus 29 g/mol). Conversely, ethoxy-functional formulations release ethanol, which is more environmentally friendly than methanol.

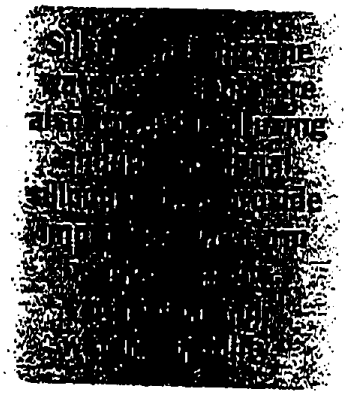
Newer concrete products require using alkaline-resistant silicones for long-term performance. Resistance is provided by silicones containing long alkyl chains and is due to the difference in aqueous solubility between methyl siliconates and long-chain alkyl siliconates.

On any high-quality alkaline substrate, bases can cleave to the silicone resins in an equilibrium reaction, which forms siliconates. The smaller, more water-soluble methyl siliconates wash away over time, whereas more oil-like, long-chain siliconates with low water solubility remain on the substrate to provide long-term performance. For example, the linear silicones and siliconates described earlier are generally methyl-functional and should not be used on alkaline substrates, while crosslinking silicones containing long-chain alkyl groups should be used on higher-pH and alkaline construction materials.

For neutral substrates, such as clay tiles, bricks, pavers and natural stones, silicone products need to provide their own source of catalysts or have the ability to cure without them. For alkoxyl-functional silicones, this requires an added catalyst, usually metal or amine. If alkoxyl-functional silicones are used on neutral construction materials, they should contain an added catalyst. For siliconates, no added catalyst is needed, since their curing mechanism involves interaction with carbon dioxide.

Silicones have been used for more than 30 years in Europe to strengthen and protect structures built with stone by consolidating and binding loose-pore structures and providing water repellency. With stone substrates, choose a water-repellent that is formulated with consolidation agents, as well as alkylsilanes and siloxanes, to physically tie materials in their pore structures.

Silane and siloxane water repellents are also formulated using amino-functional silicones that provide improved long-term beading effects, adhesion and



water solubility. These additives used in small amounts function very well, but in larger amounts cause problems with recoatability and water-repellency performance. While some amino-functional silicone content is desirable where improved beading and adhesion are needed, the hydrophilic amine groups raise the surface tension of the sealer, therefore reducing its effectiveness.

A number of water-reducible and waterborne silane- and siloxane-based products are available that use various surfactants to reduce or stop hydrolysis reactions within the emulsified products. If hydrolysis and condensation do occur within the micelles, they will become hard spheres that will not spread and that cure upon contact with the substrate. Water-repellency performance will be lost.

Therefore, the emulsification system used for waterborne products is important for obtaining good performance. Enough surfactant is needed to ensure stability, but too much hampers initial beading and water-repellency performance. Although most formulators understand that good beading does not necessarily reflect good water-repellency performance, initial beading is regarded by many consumers as a measure of water-repellency, and by some commercial applicators as a measure of sufficiency of water-repellent application (see Figure 6).

Applications and Compositions

For many applications, environmentally friendly, silicone-based water repellents are available that protect mineral-based construction materials by providing water repellency, while maintaining their natural vapor permeability and appearances. Different properties and types of silicones are required for the various applications, depending on the substrate and performance requirements.

When significant abrasion is expected, highly penetrating products should be used. Silanes and siloxanes that deeply penetrate concrete are recommended. Use silane/siloxane blends to maximize performance and cost benefits in applications with less abrasion.

On neutral, porous substrates where application can be controlled, siliconates work well. If lower-pH sealers are asked for or dense substrates are encountered, catalyzed silane/siloxane products should be used. For more alkaline substrates, products containing long-chain alkyl groups are required for long-term performance.

Natural stone protection requires formulations that contain strengthening agents and catalysts. Alkaline-resistant silicones can be used, but are not necessary for long-term performance.

Increasing attention to environmental concerns has led to the development of water-reducible and waterborne formulations to meet consumer needs (see Figure 7). Emulsion stability then becomes a key parameter. Where beading is important, low levels of amino-functional silicones and surfactants should be used.

In many applications, multiple substrates and customer requirements can lead to combinations of the above characters for an acceptable product. A sealer for masonry walls, for example, should be formulated to work well on neutral brick as well as alkaline mortar, so a catalyzed, alkaline-resistant product should be used that provides water repellency while retaining the wall's natural vapor permeability. A sealer for household use will most likely need most of the identified properties since the end-use application is highly variable.

April 7, 2000

Ms. Janette Brooks
Stationary Source Division
California Air Resources Board
2020 L Street
Sacramento, CA 95812

Subject: Comments on the Draft Program Environmental Impact Report (EIR) for Suggested Control Measure (SCM) for Architectural and Industrial Maintenance (AIM) Coatings

Dear Ms. Brooks:

On behalf of the National Paint and Coatings Association (NPCA), we are providing comments concerning the Draft Program Environmental Impact Report for Suggested Control Measure (SCM) for Architectural and Industrial Maintenance (AIM) Coatings (February 2000). A number of our member companies will also be submitting comments.

The NPCA is a voluntary, nonprofit trade association representing some 400 paint and coatings manufacturers, raw materials suppliers and distributors. As the preeminent organization representing the paint and coatings industry in the United States, NPCA's primary role is to serve as ally and advocate on legislative, regulatory and judicial issues at the federal, state and local levels.

We estimate that over 80% of the volume of AIM coatings sold in California and which are at issue under the SCM are manufactured by NPCA members.

I. GENERAL COMMENTS

4b-1 NPCA has been extensively involved in development of VOC control regulations for AIM and other coatings in California since the inception of clean air programs in California, beginning in the 1960s. Our record in this regard has always been one of constructive cooperation. We recognize the obligations of the industry to contribute its fair share in coatings technology improvements to help with the clean air problems of California. The industry even without regulatory prodding has consistently lowered the VOC content of its coatings. We seek by our participation to impart to regulatory decisions our frank and best estimates of what is technologically feasible and the associated consequences and costs of selecting certain technologies.

Most recently we have been extensively involved in the development of the current draft SCM, including assisting CARB in obtaining responses to its various requests for information in connection with the development of the SCM. We encouraged our members to forthrightly respond to the CARB survey that is

part of the factual basis for the SCM, and we encouraged members to meet with CARB staff in an effort to provide a better understanding of the complexity of the technology issues that are inherent in this regulatory effort to lower the VOC content of AIM coatings. NPCA staff and member companies have met with staff on a number of occasions in efforts to provide information that would provide a sound basis for developing an effective SCM for AIM coatings.

4b-1 As a general comment we have to say that we are disappointed with the process utilized to adopt the SCM in this case and in the lack of adequate fact finding.

The importance of this undertaking cannot be over emphasized. The SCM will stand as a presumptively valid decision about what are cost effective, commercially viable, and technologically productive coatings for usage in the forty plus air districts in California. At issue here are the millions of homes in those areas and important infrastructure, such as bridges and chemical storage facilities, related to the convenience and safety of the people in those areas. In making these critical comments, we hope you recognize that NPCA represents a the full spectrum of AIM coatings manufacturers in the United States, including companies that specialize in the development and manufacture of low VOC coatings.

NPCA does not have (indeed could not have) a position that only high VOC coatings technology is presently or foreseeably available. Aside from being a demonstrably inaccurate statement, it would cause us to lose those members that manufacture and sell low VOC coatings. Rather the position of the NPCA is as follows:

4b-2 – A low VOC product technology may be successfully used currently to meet the performance requirements of one particular application and exposure environment of a general class of coatings. However, there must first be a thorough evaluation of this technology before it can be mandated as being feasible for all or even most of the application, performance, and exposure requirements of the general class of coatings to which it belongs. For example, an expectation that currently available low VOC industrial maintenance coatings could effectively replace all other industrial maintenance coatings currently in the market place is completely at odds with the history of advances in coatings technology. Reliance on such an expectation to guide the Staff's inquiry would be dangerously misguided. There is no substitute for a thorough, open minded, and objective evaluation of existing and reasonably foreseeable coatings technologies in setting future VOC limits. We do not believe that this has occurred here.

It is important to note here that some of the NPCA member companies that are most concerned about the proposed limits are companies that manufacture low

VOC coatings and emphasize the sales of their low VOC coatings because of their profitability.

We note the EIR characterizes the SCM as follows: "To fulfill [its] statutory mandates, the ARB often provides guidance and other assistance to the districts, including the development of model rules, such as the Suggested Control Measure for Architectural Coatings." (Draft Program EIR at page I-2)

The SCM thus carries great weight with the individual air districts, which as staff has noted throughout this process are the agents that ultimately have to formally adopt the limits and requirements of the SCM as district rules before they can be effective. In this sense, however, the SCM my be better conceived of as a "suggestion" from a reviewing authority that ultimately has the authority to
4b-3 disapprove plans from the districts that do not achieve the progress thought achievable by CARB. As a practical matter, therefore, districts do not deviate greatly if at all from CARB SCMs, even in cases where they might have reservations about their conclusions.

The EIR under discussion here is an instrumental document in the SCM adoption process as well as in the adoption of individual district rules that are based upon it. As noted by staff in the Draft Program Environmental Impact Report for Suggested Control Measure (SCM) for Architectural and Industrial Maintenance (AIM) Coatings:

> "This Draft Program EIR has specifically and comprehensively addressed the environmental impacts associated with the Architectural Coatings SCM in accordance with CEQA, so that the districts, if they choose to do so, may rely on the analysis in the Program EIR when adopting or amending their architectural coatings rules." (Draft Program EIR at page I-3)

Consequently, it is important for the Program EIR to be as accurate as possible in that districts may rely upon it with out further consideration. It will in short become a presumptively valid document that will not lend itself readily to subsequent questioning or criticism by the district.

It is for these reasons that we remain deeply concerned about what we consider to be fundamentally flawed conclusions about the technological and economic
4b-4 feasibility of many of the VOC limits that are the basis of the analysis of the EIR. If the staff is in error about the technological feasibility of the limits that it has specified in the SCM, then the environmental impacts assessed in the EIR are equally flawed.

II. DUE PROCESS/INTERSTATE COMMERCE ISSUES -FEDERAL AND STATE

Serious federal constitutional due process and interstate commerce issues can arise in the development of an SCM if it is not handled properly. As noted, the SCM is intended to serve as a consensus template for the districts to adopt without having to expend the time and resources that otherwise would be required of them. There is nothing inherently wrong with this approach and if implemented as intended, it can result in a more efficient development of reasonable regulatory requirements, saving both the regulators and the regulated community time and money. Problems can arise, however, if insufficient time and effort is afforded to ensure a full airing of issues. The potential for a classic 4b-5 "Catch-22" inheres in the process. The SCM is only guidance, so therefore it need not comport with the requirements of a rulemaking. The formal protections of rulemaking are intended by the process to be afforded when the districts consider adopting the SCM. But because the SCM supposedly reflects already vetted technology, districts are encouraged to rely upon the fact findings of the SCM for their fact findings. If in fact the SCM technology is not truly consensus technology, then the public never really has a realistic opportunity to a full airing of its concerns– the SCM is conducted without the requirements of administrative legally sufficient fact findings and the districts in turn are not required to reconsider the findings except as their discretion dictates. This raises concerns about the potential for denial of due process under the federal and California constitutions as well as the potential for unconstitutional interference with interstate commerce as the resulting regulation may impose disproportionate burdens on out of state manufacturers.

III. INFORMATION RELIED UPON BY THE EIR

The staff has relied upon the following for its conclusions in the EIR:

- Results of laboratory tests from the NTS study and other results from the 1995 Harlan Study

4b-6

- What the EIR characterizes as an "extensive" review of compliant coatings product data sheets.

- Results from the CARB 1998 AIM survey that the EIR characterizes as indicating that a large percentage of coatings already meet the proposed limits.

- Information on "foreseeable coatings technologies " obtained from resin suppliers and coatings manufacturers data sheets and (promotional) magazine articles

We discuss each of these and their inherent limitations below.

A. The EIR's Treatment of Test Data

The EIR's treatment of available test data manifests fundamental misconceptions about the effective use of such information by the industry.

4b-7 Coatings manufacturers extensively test new coatings before introducing them to the market. These test include two and three year field exposure tests because it is only under such real world conditions that new coatings' performance characteristics can be assured.

As mentioned in the EIR document, a number of the low VOC coatings that would be mandated by the SCM are the subject of a study being conducted by the SCAQMD pursuant to revisions to its AIM rule in May 1999. The EIR states,

> "In addition to the laboratory results, accelerated actual exposure, real time actual exposure, and actual application characteristics studies are continuing. The results of the study are an important part of our technical evaluation of these six coating categories (see Appendix D, Description and Technical Assessment of the Coating Categories). The purpose of the NTS study was to test the application and durability performance of very low-VOC, low-VOC, and just-compliant coatings for the following six coating categories:
> · Industrial Maintenance Coatings
> · Nonflat Coatings
> · Primers, Sealers, and Undercoaters
> · Quick-Dry Enamels
> · Quick-Dry Primers, Sealers, and Undercoaters
> · Waterproofing Sealers"
> (Emphasis added) (Draft Program EIR at page II-24)

4b-8

While the EIR states that the results of the study are an important part of the staff's technical evaluation for the six coatings categories, it must be noted that what the industry consider to be the most important tests - real time actual exposure, and actual application characteristics studies - have not been completed. Consequently, it will be necessary for the districts to evaluate the technology of the limits for these coatings before accepting them as technologically feasible. In this regard, we also note that in Appendix D of the EIR, there is language suggesting that these tests are not really necessary to warrant the conclusions reached in the EIR about the technological feasibility of the coatings at issue. As indicated, therefore, the SCM will be issued without the benefit of the most crucial results of the most important of these tests. Apparently, the staff believes that in some respects the laboratory results of the NTS study are sufficient to justify its conclusions:

> "The ARB staff has analyzed the impact of allegedly ineffective low-VOC coatings. There is a wide range of commercially available coatings that

meet the proposed VOC content limits in the SCM. ..... Additionally, the results of the SCAQMD's NTS study support these findings. The laboratory results of the SCAQMD's NTS study reveal that there are currently available coatings that comply with the proposed VOC content limits and with coating and durability characteristics comparable to existing high-VOC coatings." (Emphasis added) (Draft Program EIR at page C-21)

4b-8

We disagree with this and believe that any decisions about the technological and economic feasibility of the limits proposed in the SCM for the six categories under consideration must await the final results of the study which will include real time actual exposure, and actual application characteristics studies.

In rejecting our request to formally commit to a technical assessment of the SCM limits prior to their becoming effective, the staff stated the following which suggests that it too believes that the final word is not in on its conclusion that the SCM proposes technologically and economically feasible coatings limits.

"Even though the ARB staff believes that compliant coatings are available to meet the SCM limits, we are committed to working with the SCAQMD, other interested districts, and the architectural coatings industry as they conduct technology assessments of the future VOC limits..... Since the ARB staff will be conducting the assessments, we do not believe that it is necessary to include a technology assessment provision in the SCM ..... After each technology assessment the ARB staff will report the results to the staff of each district, and district staff can then report to their District Governing Boards as to the appropriateness of maintaining the applicable future VOC limits." (Draft Program EIR at pages C- 7-8)

4b-9

These statements taken as a whole indicate that the conclusions of the staff about the feasibility of the limits and coatings the SCM proposes are suspect and will require further analysis.

Additionally, it is our position that the NTS study laboratory results that are available are suspect in their own right as has been explained to staff in a letter from Christine Stanley, Vice President of Technology, of Ameron Coatings. See also NPCA's letter to Jim Nyarady on this subject.

4b-10

With respect to the Harlan Study there are several issues.

It is an incomplete report, providing only raw data. The Abstract of the study states:

4b-11

" Data were complied for each product evaluated and is presented in this report. No comparison of the properties or performance of the samples was required by this contract." (Emphasis added) (Harlan Study at page 4)

The evaluation of the raw data was left to the ARB staff and not to the contractor who was the coatings expert.

The report consists of a series of summary tables and test reports for individual coatings. Information on individual coatings (such as recommended use and application of each of the coatings tested) is NOT included in the report. This makes it very difficult to evaluate and compare the data in the summary sheets .

4b-11 The report was not peer reviewed. Without some industry involvement or review of the testing and reporting of the data, the conclusions based on the report are suspect.

Blind samples were used making any verification or comparison to other test results impossible. On the other hand when other testing groups, like Consumer Reports Magazine, do coatings testing, the products and manufacturers are identified so that any inconsistent or erroneous results can be spotted and challenged.

Different contractors were involved. Many of the tests performed in the study are very subjective types of tests, in which the results can vary markedly from technician to technician, e.g., pencil hardness, block resistance, application properties adhesion.

There is no indications of what if any QA/QC procedures were used. Nothing is mentioned about the qualification of the laboratories or their personnel and their QA/QC procedures.

The Appropriate Way to Make Coatings Technology Comparisons

With respect to making comparisons of low VOC coatings with higher VOC coatings Table IV-2 in Chapter IV of the EIR does so on the basis of the following characteristics of a coating

4b-12

- Range of VOC
- Average VOC Content
- Average Solids by Volume
- Average Coverage
- Average Dry Time
- Average Pot Life
- Average Shelf Life

All of the above are interesting but relatively insignificant properties of a coating. They do not really tell one anything about the performance and durability characteristics of the coating or its suitability for a particular job .

A true comparison of coatings characteristics must take into consideration the following factors:

- Performance - how does the coating perform – What type of exposure was coating formulated to withstand, e.g., acid- base; waste water, high temperature? What are its real performance characteristics? Performance is more than cure time and shelf life. It includes durability under real life/field conditions.

- Application latitude – What type of equipment is need for application? Is highly sophisticated spray equipment required? Are there any limits on the application temperature or atmospheric (humidity) conditions under which it can be applied? What film thickness does it have to be applied at in order to meet the required performance characteristics?

4b-13

- Surface latitude – What type of surface can the coating be applied to and what type of surface preparation MUST be done to insure a proper job? Surface preparation is crucial if an acceptable job is to be completed.

- Cost effectiveness – An important and crucial factor that could tip the decision on whether a coating job is undertaken. Cost effectiveness includes the review of the service life of the coating, its application costs and required surface preparation, as well as the cost of the coating itself.

- Waste considerations: Will the use of a particular coating generate a high amount of waste product and will any special surface preparation cause the generation of additional solid or hazardous waste, e.g., old heavy metal containing coating that MUST be totally removed before the application of the new highly sophisticated coating 2K product.

These are the essential issues that have to be addressed when evaluating whether one coating can be substituted for another. For industrial maintenance coatings and other high performance coatings this is a very complex task.

It is obvious from a reading of the EIR that CARB did not consider these five very important factors in its review of product data sheets. These are the key factors that any knowledgeable coatings formulator, specifier or applicator would consider crucial in deciding whether a particular coating is suitable for a particular application.

4b-14

It is our position that before any district could reasonably adopt the limits of the proposed SCM, it should undertake an evaluation of these factors with respect to the coatings at issue.

B. Review of Compliant Coatings Product Data Sheets

It appears that too much reliance has been placed upon product data sheets for the staff's conclusions. This is particularly troublesome in light of the fact that product data sheets often require review by a coatings expert in order to be fully comprehended. An example of the basis for our concerns is seen in the following statement from the EIR:

4b-15

> "ARB staff evaluated hundreds of conventional and low – VOC coatings product data sheets. The product data sheets indicated that low-VOC coatings do not require substantially different surface preparation, including power washing, than conventional coatings." (Draft Prgram EIR at page C-15)

This statement is completely at variance with what is commonly known within the industry and in fact is implemented in training and education by such organizations as Paint and Decorating Contractors of America and the Society of Protective Coatings, i.e., more attention to proper surface preparation is required of the newer two pack high performance coatings than conventional coatings. It is also true that instructions for conventional coatings require adequate surface preparation. But the staff's equating the degree of surface preparation required by two types of instructions that are associated with radically different coatings gives us concern that it does not fully comprehend the greatly differing consequences associated with using these two different coatings systems.

Staff's reliance on the product data sheets also apparently convinced it that there are no pot life problems associated with multi-component systems:

> " Regarding pot life, the ARB staff's review of currently available, multi-component low-VOC coatings revealed that pot-life problems are not anticipated." (Draft Program EIR at page C-18)

4b-16

This too is completely at variance with the real world experience of the industry, notwithstanding individual product data sheets that may minimize the problems or state that they are not substantial if "instructions for use" are closely followed. As explained in comments being submitted by Ameron Coatings concerning the EIR, the pot life issue is an extremely significant and complex issue affecting the cost of application.

C. Results from the CARB 1998 AIM Survey

4b-17

With respect to the results from the CARB survey, we again caution that low VOC product technology may be successfully used currently to meet the performance requirements of one particular application and exposure environment of a general class of coatings. However, there must first be a thorough evaluation of this technology before it can be mandated as being

feasible for all or even most of the application, performance, and exposure requirements of the general class of coatings to which it belongs.

D. Information on "Foreseeable Coatings Technologies" from Promotional Materials of Resin and Coatings Manufacturers

4b-18 Caution should be exercised in relying on information from resins and coatings manufacturers and their promotional materials that are published in trade journals that are not peer reviewed. Statements about the properties of a resin starting formula are just that – where the coatings formulator begins to determine whether an adequate cost effective coating may be developed based on it.

E. Appendix E Tables

4b-19 As numerous industry commenters have pointed out, many of the coatings products listed in the tables in Appendix E do not belong in the coatings category in which they are listed. For example: over 30 percent of the products listed as lacquers are in reality polyurethane varnishes.

IV. DISCUSSION OF SPECIFIC COATINGS CATEGORIES

A. Floor Coatings

Originally as this category was developed under the national AIM rule it was defined as:

4b-20 > "an **opaque** coating with a high degree of abrasion resistance that is formulated and recommended for application to flooring including, but not limited to, **decks**, **porches**, and **steps**, in a residential setting"

During the discussions surrounding the development of the revisions of SCAQMD's Rule 1113, the reference to residential setting was dropped in order to expand the use of the coatings to commercial and institutional settings.

CARB now would expand the definition to cover floors exposed to extreme environmental conditions which historically have been covered by industrial maintenance coating category. In so doing, it would prevent the use of higher VOC industrial maintenance coatings on floors in settings that require such coatings. This would mean that the conditions would allow for use of the industrial maintenance coatings on walls, but only lower VOC materials could be used on the floors exposed to the same conditions.

4b-21 The data sheets that CARB is relying on to make their decision concerning the VOC limitation cover a wide variety of product types and hodge-podge of coatings technologies. These products range from simple latex porch and deck enamels used by home owners (which have very limited applications and uses)

to "exotic" 2-K materials that require complex mixing and application equipment and special surface preparations (only available to trained professional applicators) or which pose safety concerns. These materials often are accompanied by such warnings as,

4b-21 " For industrial use only by professional applicators"; or " An eye wash and safety shower should be nearby and ready for use."

Others are elastomeric floor coatings that require film build of over 22- 24 mils in order to be effective. And others have severe use limitations, e.g., they are not recommended as exterior topcoats or are not be applied to horizontal surfaces that become slippery when wet.

Additionally, a number of the products cited by the EIR for the low VOC floor coatings only represent raw material suppliers best "suggested starting formulas" and are not commercially viable products.

Also, several of the coatings listed as floor coatings do not belong in the "floor coating" category, e.g., " semi clear concrete sealers and safety and zone marking paint."

It should be obvious from the wide variety of products currently being sold as floor coatings, that no single product or technology is able to satisfy all of the varying application conditions and performance requirements covered by this category. The ARB's decision to totally rely on high end 2-K or polyurethane technology that is normally marketed for industrial application only by
4b-22 professional painters is flawed and does not reflect the true market place needs for floor coatings in all situations such as residential, institutional and commercial.

We recommend that the definition for *"floor coating"* be revised to read:

"Floor Coating: An opaque coating formulated and recommended for application to flooring including, but not limited to, decks, porches, and steps, for the purposes of abrasion resistance."

4b-23 Also the definition for "*Industrial Maintenance Coatings*" should be revised to remove the phase "*excluding floor coatings but*".

B. Non Flat Coatings; Primers, Sealers and Undercoaters; Stains; Industrial Maintenance Coatings; and Lacquers

Through out this process, NPCA has attempted to bring in the coatings experts
4b-24 from its membership to discuss the technological and economic feasibility issues that are involved with the proposed SCM limits. We are particularly concerned about the coatings identified above and we urge CARB to consider the comments and information that have been provided by our members and other

coatings experts. In doing this we believe that CARB should rely on the consensus judgement of the experts.

C. Categories Not Proposed for Inclusion in SCM

There are sixteen categories of coatings that are recognized by the national AIM coatings rule which are rejected for inclusion in the SCM. Among the reasons cited for this decision in the EIR are the following:

> "With the exception of antigraffiti coatings, these categories are not generally included in any of California's district architectural coatings regulations. The products under these categories are currently either: (1) subject to other coating categories in district regulations; (2) sold only under the small container exemption; or (3) not sold in California (at least in areas with architectural coatings rules). Nevertheless, we researched each of these categories because they were included in the U.S. EPA's architectural coatings regulation, and because in many cases these products will be subject to lower VOC limits under the proposed SCM compared to current district regulations. In researching these categories we considered a variety of factors, including: (1) the VOC limit they would be subject to under the proposed SCM; (2) the potential for reformulation as demonstrated by similar products already complying with the VOC limits in the proposed SCM; (3) the availability of products that do not fall under the category as defined in the national rule, but fulfill the same basic function at a lower VOC content; and (4) the extent to which products under the category are used in California. As explained in the following sections, we do not believe it is necessary to incorporate a new category and VOC limit for any of these categories." (Draft Program EIR, Appendix D, at page 178)

4b-25

We understand that staff is reconsidering its initial decision to exclude the concrete protective coatings and now plans to incorporate the "concrete protective coatings" category recognized by the national AIM coatings rule at a VOC limit of 400 grams per liter in the SCM. In doing so, the staff appears primarily to rely upon on the information provided by Textured Coatings of America, an NPCA member. NPCA fully endorses the position of Textured Coatings and the inclusion of this category.

Another coating at issue here is the thermoplastic rubber coatings and mastics coating. (Draft Program EIR, Appendix D, at page 205) Inland Coatings, an NPCA member provided information to staff requesting this coating as defined by the national AIM coatings rule at a limit of 550 grams per liter of coating. It has provided information to justify its inclusion, and is prepared to provide more to staff in this connection. Discussions with staff about the exchange of information between Inland Coatings and staff indicate that there may have been some miscommunication. Staff stated that the company failed to provide sufficient

4b-26

information that demonstrated that its thermoplastic rubber products are more durable, and result in less emissions over time than comparable bituminous roof products or latex roof products. "We have no data to substantiate that thermoplastic rubber roofing products outlast their bituminous counterparts. We also note that latex roofing products are available." Staff also rejected the company's claim that its thermoplastic rubber products work in situations where water-based or bituminous products fail, e.g., they adhere well to single-ply membranes and adhere well when exposed to ponding water. "We have no data to substantiate these performance claims." The EIR concludes this discussion by stating, "...since thermoplastic rubber products are not used in California, we assume that other roofing products can be used to address these situations."

4b-26

It is our understanding that the company has attempted to respond to these points and is prepared to provide more information on this matter. For example, with respect to the issue of durability, it is generally accepted information within the industry that coatings like Inland's dramatically outlast bituminous coatings. The nature of bituminous coatings is that they are of limited durability, and must be repaired and refurbished on a fairly regular basis. Inland Coatings can demonstrate single application, no repair histories for its coatings extending over several years. If this information was not provided in a manner that staff found sufficient, the company is prepared to provide more information. The same is true of its claims about single-ply membranes, with one of the major manufacturers of singly ply membrane coatings recommending Inland Coatings for repair of its product. Finally concerning the fact that the company's product is not used in California, this has occurred only because the company has refused requests from distributors to carry its product for unregulated areas in California simply from concern that through no fault of its own, the materials might wind up in a regulated area where they would be noncompliant. It is ironic that Inland's conscientiousness about California's clean air requirements now work against it for a reason that is wholly unrelated to issues of technological efficacy and more efficient methods for reducing over all VOC emissions from coatings.

Another coating that falls into this category is nuclear coatings about which Ameron Coatings, an NPCA member, has provided comments. The point being raised by the company is that the proposal would require the use of coatings that would be astronomically more expensive than existing systems and this added expense is grossly disproportionate to the minuscule amounts of VOC emissions that result from the small usage of the existing coatings systems. We urge you to consider the company's comments.

4b-27

NPCA also believes that the staff should reconsider its decision to exclude the other categories. In particular, we do not believe that the staff has had an opportunity to receive or fully review all of the information that would be necessary in order to make a sound decision on these coatings. It must be recognized that the process to date has necessarily focused on the larger

4b-28

coatings categories and the manufacturers of the coatings at issue here, many of which are niche market coatings, are often small businesses that need more time to respond. We request that this be given some consideration and that staff keep the door open for additional information about these coatings.

In reviewing data and technology for this area we suggest that the following general principles be considered. It should be recognized that coatings are
4b-28 developed for certain purposes. In this highly competitive industry, if a lower VOC product can cost effectively serve the same coatings requirements of a higher VOC product, it is selected over the higher VOC product. The U.S. Environmental Protection Agency in developing the national AIM coatings rule recognized this and the fact that many of these coatings were low volume niche coatings that previously fell under the general category of industrial maintenance coatings. They had to be specifically identified and broken out as coatings in their own right when the industrial maintenance coating category was lowered to VOC levels that were below the levels needed for these coatings.

The EIR is very cursory in its discussion for excluding these coatings, often stating little more than assumptions that are based upon the general coatings category of industrial maintenance coatings. Data concerning these coatings may not have been reported under the category. For example, with respect to chalkboard resurfacing coatings, the EIR reflects that only a very small portion of the coatings reported in the CARB AIM survey were identified as chalkboard resurfacing coatings. It is likely that some of the volume used in California was reported as general industrial maintenance coatings.

Consequently, CARB should consider the possibility that information developed later in the rulemaking will demonstrate that indeed a higher VOC limit is required for these coatings. Like comments apply to the other excluded coatings categories. In any event, NPCA plans to continue to track this area during this rulemaking and to provide additional information on these excluded coatings as it becomes available to the NPCA .

V. REGULATORY ALTERNATIVES

A. Averaging

We are concerned that ARB has not chosen to include an Averaging Compliance
4b-29 Option in the proposed SCM or at least retain the placeholder Statement on Averaging that appeared in the December 1, 1999 draft of the SCM. Last December, the ARB formed a joint committee with SCAQMD to develop a workable averaging program. While we agree there are clearly differences between industry, SCAQMD and ARB on how to design a workable averaging program, ARB has chosen not to move forward with trying to resolve these difficulties. Instead the ARB has placed a lower priority on developing this program by indicating "... but the existence or absence of averaging does not

affect either the ARB's analysis of the technical feasibility of the VOC limits in the SCM, or the ARB's environmental analysis for the SCM." (Draft Program EIR at page V-159)

4b-29 We disagree with this position. In fact, averaging will be required to make some of the requirements feasible.

The ARB's proposed SCM is nearly identical to the SCAQMD's revised Rule 1113, a rule which was developed for the only district in the country ranked as severe ozone non-attainment area. Without an averaging provision, ARB's proposed SCM is more restrictive than the SCAQMD's revised Rule 1113.

B. Extended Compliance Deadlines

In of Chapter V. Project Alternatives, the ARB discusses four regulatory alternatives. Alternative B would extend all of the effective dates for the VOC content limits to January 1, 2004 with the VOC content limits for the affected
4b-30 coatings being identical to those in the February 11, 2000 draft. The ARB staff has rejected this alternative saying that any delay in achieving these emission reductions is not technically or economically justified. We disagree with this conclusion and urge the ARB to review their decision in light of industry's comments on the technical merits of the ARB's SCM development.

VI. MODEL FORMULAS TO ESTIMATE POTENTIAL MATERIALS COSTS

There are fundamental problems with the use of model formulas to estimate potential material costs.

The approach carries the inherent assumption that only one coating technology (resin technology) will be used to meet the lower VOC limits. Said another way,
4b-31 the approach implies that one technology will meet all the requirements of a category. This is unlikely and therefore the approach will not accurately estimate associated reformulation costs.

The model formulas are simplistic. Generally one cannot simply substitute a low VOC resin for a high VOC resin without changing other important components of the coating.

To obtain anything close to approximating a realistic estimate using this approach world require the use of real world formulas.

A more straightforward and more accurate way of estimating and comparing raw material costs of high and VOC coatings would be to compare only the cost of
4b-32 the high VOC resin to the low VOC resin on a WEIGHT OR VOLUME SOLIDS basis. By doing this one would at least get an idea of the magnitude of the cost difference, e.g., 1.5 time or 2 times more costly.

To obtain a better cost comparison beyond this, one would have to have to actual formulas for the current high VOC product and the low VOC replacement.

4b-32 Also it is important to note that raw material cost are only one factor in calculating the total cost of reformulating coatings. Additional costs include packaging costs, direct R&D labor, etc.

VII. CONCLUSION

4b-33 We appreciate the opportunity to provide comments on the EIR. We will continue to work with staff in the development of the SCM with a view to providing it with our best judgments about the technological and economic feasibility of the coatings technology decisions it is contemplating. But ultimately, the issue of whether Californians will continue to have access to cost effective, productive coatings rests with CARB and the districts. Our goal is to ensure that we have provided the decision makers with our best technical information and judgement.

Sincerely,

Jim Sell
Senior Counsel

Robert J. Nelson
Director Environmental Affairs

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

March 1, 2000

Mr. Jim Nyarady
Strategy Evaluation Section
California Air Resources Board
2020 L Street
P.O. Box 2815
Sacramento, CA 95812

Re: Comments on Proposed Amendments to the Suggested Control Measure for Architectural Coatings

Dear Mr. Nyarady:

At the most recent meeting of the Architectural Coatings Working Group on February 3, 2000, an overview of the latest changes to the Suggested Control Measure (SCM) was presented. This letter contains the Environmental Protection Agency's (EPA) comments on changes to the draft SCM since the version dated December 1, 1999. This includes proposed language changes contained in the January 28 and February 11, 2000 drafts. We are primarily concerned with the clarity and enforceability of the SCM and its stringency relative to the EPA's National AIM Rule (40 CFR Part 59, Subpart D) and current coating technology. 5-1

Our discussions at the February 3 Working Group meeting and our initial review of the draft SCM reveals that the most significant changes relate to the postponement of the effective date of the regulation and the addition of several specialty coating category definitions and limits. These changes are generally consistent with national regulations and reflect available coating technology. Listed below are several areas where we question certain proposed changes to the SCM. Section numbers refer to the February 11, 2000 draft unless otherwise indicated.

1. The new category for temperature-indicator safety coatings is defined in Section 2.52. Based on the definition, it is unclear how these coatings differ from the high-temperature coatings defined in Section 2.24. Both groups of coatings must sustain exposure to temperatures above 204 degrees Celsius. Does the ability of temperature-indicator safety coatings to change color necessitate the higher VOC limit contained in Table 1? 5-2

2. The provision in Section 3.2 that the most restrictive VOC limit shall apply in cases where a coating meets the definition for more than one coating category has been changed. It appears that the removal of certain language in Sections 3.2.2, 3.2.5, 3.2.8, and 3.2.9 have broadened the 5-3

5-3 exception to Section 3.2. The addition of Sections 3.2.11-14 also appear to widen the scope of the exception to Section 3.2. Collectively, these changes make the "Most Restrictive VOC Limit" provision less stringent than the corresponding provision in EPA's National AIM Rule §59.402(c). These differences between the applicable VOC limits in the SCM and the National AIM Rule created by variations in the wording of this provision may cause confusion among the regulated entities.

5-4 3. Certain labeling requirements for quick-dry and recycled coatings previously contained in Sections 4.1.7 and 4.1.10 of the January 28, 2000 draft have been removed from the SCM. It is unclear why these sections have been removed. Section 4.1.10, in particular, should be retained for consistency with the labeling requirements contained in the National AIM Rule §59.405(c).

5-5 4. The reporting requirements for recycled coatings previously contained in Sections 6.5.1-3 of the January 28, 2000 draft have also been removed from the SCM. The information that was previously required under these sections to be reported must still be reported to EPA under the National AIM Rule §59.408(c). Submission of this information to CARB should not constitute any additional burden for manufacturers or importers of recycled coatings and should be tracked by CARB to ensure that recycled coatings are meeting the minimum percentages of secondary or post-consumer contents specified in Section 2.38 and are resulting in the diversion of these coatings from landfills.

5-6 5. The proposed 530 g/L VOC limit for antenna coatings, although consistent with the EPA's National Rule VOC limit, may create a relaxation issue for certain districts who wish to add this category to their local rules and who have SIP approved rules containing a 420 g/L limit for industrial maintenance coatings. Appendix D of the draft EIR (page 20) indicates that antenna coatings are subject to the industrial maintenance category. Once separated from the industrial maintenance category, antenna coating formulations could increase in VOC content from 420 g/L to 530 g/L.

5-7 Aside from these larger issues, the draft SCM contains a minor editorial error. The category and VOC limit for low solids coatings appears twice in Table 1. One of the entries should be deleted.

Thank you for the opportunity to comment on the proposed amendments. We acknowledge the effort involved in characterizing this broad VOC source category and developing this type of guidance. If you have any questions, please feel free to contact me at (415) 744-1185 or Yvonne Fong of my staff at (415) 744-1199.

Sincerely,

Andrew Steckel
Chief, Rulemaking Office

cc: Harry Metzger, CARB
Kathy Diehl, EPA

PALMER ASPHALT COMPANY

196 WEST 5th STREET • P.O. Box 58
BAYONNE, NEW JERSEY 07002
Telephone: [201] 339-0855 • FAX: [201] 339-8320

March 6, 2000

Jim Nyarady, Manager
Strategy Evaluation Section
Air Resources Board
2020 L Street
P.O. Box 2815
Sacramento, California 95812

Dear Mr. Nyarady:

I have your letter of February 25 inviting me to an Air Resources Board Workshop on March 16. I regret I will not be able to attend this meeting.

However, I would like to call your attention to my letter of December 6 as it concerns both bituminous coatings and bituminous primers. The subject of my letter, the proposed restrictive VOC limits, seems to have been totally ignored.

6-1

I find it especially unusual to see lower limitations for a primer than the subsequent coatings likely to be applied over the primer. I just don't understand how we can be expected to produce a primer with a heavier viscosity and, thus applied at a rate of application in excess of the surface coatings. It makes very little sense to me but then again, what do I know after 43 years in this industry!

Very truly yours,

PALMER ASPHALT COMPANY

Lewis S. Ripps
President

LSR/ed

PALMER ASPHALT COMPANY

196 WEST 5th STREET • P.O. Box 58
BAYONNE, NEW JERSEY 07002
Telephone: (201) 339-0855 • FAX: (201) 339-8320

December 6, 1999

Jim Nyarady, Manager
Strategy Evaluation Section
Air Resources Board
2020 L Street
P.O. Box 2815
Sacramento, California 95812

Dear Mr. Nyarady:

I have the communication of December 2 from Ms. Janette Brooks which enclosed the draft architectural control measure offered for our review. I would like to make the following comments.

6-2 With respect to the VOC limitations in the category of bituminous roof coatings the proposed 250 grams per liter limitation is precisely half of the limitation permitted in the recenlty adopted national EPA rule (500 grams per liter). In addition, it is substantially below the current 300 grams per liter limit which I believe is your current regulation. Reducing the VOC content in this particular line of product will result in a coating likely to be brittle and lacking flexibility normally associated with bituminous roof coatings. It will result in the application of a thicker film which would defeat the intent of lowering VOCs because more will be applied to the surface.

6-3 I don't believe our industry has done a very good job with respect to explaining the use of bituminous primers in the application of a wide variety of roof systems. This particular material is most often specified for conformance with ASTM D41. In order to conform to that ASTM designation most asphalt primers would probably require a minimum VOC content of 480-500 grams per liter. As the former chairman, and current vice chairman, of the ASTM sub-committee responsible for this particular standard I can tell you very honestly that this ASTM Sub-Committee has not been able to devise an asphalt primer standard that would satisfy your proposed low VOC requirements.

Here, also, trying to reduce the solvent content and develop a replacement to satisfy your proposed regulation would result in the application of a heavier film of product resulting in more solvent applied per square foot. In addition it would probably mean that the dry time for the primer would be delayed and that would result in an open and unprotected roof for an unreasonable and dangerous period of time. 6-3

The bottom line is that we are asking you to establish within your bituminous roof coatings category an exception for bituminous roof primers which should be permitted to have a VOC content of 500 grams per liter.

Thank you and respectfully.

Very truly yours,

PALMER ASPHALT COMPANY

Lewis S. Ripps
President

LSR/ed

Comment Letter 7

The commenter referenced material in a binder sent to the ARB on December 22, 1999. Some material in the letter and attachments is confidential, and is redacted.

FSC Coating

Coatings Engineered For Ultimate Performance

March 13, 2000

Mr. Jim Nyaradi, P.E.
Manager, Strategy Evaluation Section
California Environmental Protection Agency
Air Resources Board, Stationary Source Division
P.O. Box 2815
Sacramento, Ca. 95812

Subject: 1) Request For Response to Comments & Recommendations On Architectural Coatings Draft Rule
2) Evaluation For VOC Calculation Method Regarding Treatment Of Exempt Solvents

Dear Jim,

7-1 Having conferred with Greg Allen and Evan Wong, I am writing this letter to put on the official record my request for an official response from the Air Resource Board to my comments on the new draft rules. The topics that I have addressed are included in 1) my November 20th letter to you, 2) the outline from our September meeting and 3) the notebook I forwarded in January which included discussion and data sheets on each specific coating area warranting additional consideration.

7-2 In addition, I request review of the current method of calculating VOC and changes to include the exempt solvent inside the calculation equation. The problem is that I believe exempt solvents are unfairly treated in the calculation. By backing out water and exempt hydrocarbon solvents, the manufacturer is actually penalized for doing what the Air Resource Board wants him to do. I believe that the VOC calculation method should be altered to include the these exempt solvents in the calculation to give benefit to the manufacturer for doing the right thing and using more environmentally friendly solvents. In talking to Greg Allen, he had gone through the calculations also and found that even though we were using high percentages of exempt solvents in some our products, the current VOC calculation method yielded an artificially high value in comparison to the actual percentage of VOC producing solvent. It is very misleading as to actually what has been done to lower VOC emissions in each of the subject systems. This is particularly important to all water-borne systems, metal maintenance systems, urethanes & epoxies, acrylic lacquers for sealing masonry and high solids, quick dry varnishes.

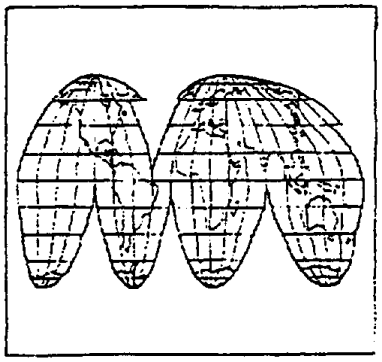
7-3 Jim, I appreciate the willingness of the your engineering staff to look closely at the issues I have raised and consider alternative solutions that accomplish all of our goals. It continues to be refreshing to experience a high level of cooperation with our hope still being that the net result will be a better balanced rule resulting in benefits environmentally, lower costs to the end user and enhanced system performance. We feel this is the win-win solution that is needed.

I look forward to your response. FSC stands ready to help in any capacity that it can.

Sincerely,

Lawrence W. Cerenzie
Engineering Manager

Letterdraft.doc



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SEAL-KRETE Masonry and Concrete Sealers
Epoxy & Urethane Floor Coatings
AMERICAN Industrial Coatings
ZERO-RUST Coatings
ALL DECK Systems

FAX COVER SHEET

TO: Jim Nyarady FAX#: _____

COMPANY: ARB PHONE#: _____

FROM: Larry Hardcopy To Follow? YES / NO

DATE: 3/13/2000 # OF PAGES INCLUDING COVER SHEET _____

Dear Jim —

Attached is my "official request". Could you please cc: Greg & Evan?

Thanks

Larry

P.S. I cannot make the 16th meeting.

#1 Rated TWP Natural Wood Finishes — "GRAFFITI NO MORE" Paints & Removers — Epoxy & Urethane Floor Coatings
TWP MILDEW SEALER — ZERO-RUST Primers & SA-3 SILICONE ALKYD Topcoats — Biodegradeable BIO-STRIP
SEAL-KRETE Masonry Sealers — SKID-PROOF Traffic Coatings — POLYSHIELD Graffiti Coatings
Fire Research Fire Retardants & Coatings — AWR Super Sealers For Roadways, Driveways & Parking Garages
URA-FLOOR For Gym & Hardwood Floors — ALL DECK Waterproofing Systems — American Industrial Coatings

5360 Eastgate Mall, Suite "F", San Diego, CA 92121
FAX #: (858) 558-2159 PHONE #: (858) 558-0800

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November 20, 1999

Mr. James Nyaradi, P.E.
Manager, Strategy Evaluation Section
California Environmental Protection Agency
Air Resources Board
Stationary Source Division
P.O. Box 2815
Sacramento; Ca. 95812

Subject: Follow-Up Information To Recent Coatings VOC Recommendations

Dear Jim,

Attached is the supporting information requested by your technical staff during our recent meeting in late September on the new proposed air quality rules. It was a pleasure to meet with the engineering staff to give our recommendations and support for those recommendations as well as to receive direct feedback from the people deeply involved in the rule making process.

7-4 The goal to achieve cleaner and healthier air is not only noble but a true benefit to all of the citizens of California. I believe that the recommendations and comments on the proposals are not only valid but will help to achieve that end when all factors are weighed and balanced.

It is worthy to note that many of the technologies that we discussed were developed for and used on San Francisco's famed PIER 39. It stands as our true test for water and solvent-borne systems alike that now are considered as "no known equals" -- even by public entities including the military.

7-5 **Single Component – Simplicity That Leads To Higher Performance & Higher Compliance**

In most cases our discussion will center on **air dry, single component systems**. The **simplicity** of this approach leads to **greater compliance with application instructions** and less **waste** or product loss as is associated with using multi-component systems. The adhesion of these systems to surfaces with less than perfect surface preparation are unmatched as is testified to in 1) the attached AKZO Laboratory letter after 2000 hours Salt Fog testing on smooth, brush finished bare steel (without sand blast) and 2) the attached [redacted] letter from [redacted] following over 2 ½ years of field and laboratory testing.

In my conversation this week with one of materials engineers from Ingalls Shipyard, they were having many problems using 2 component, mix-at-the-tip epoxies. The tremendous variation in adhesion because of the tremendous reactivity of these coatings BEFORE they reach the steel prevents the penetration into the surface matrix that is associated with slower reacting systems. **The problems associated with 90-100 solids systems must be recognized and considered -- additional costs and losses with poor repairability are a given**. Increased surface preparation in terms of **deeper blast patterns** and **greater use of sand** (and the disposal of these now "hazardous" residues) must be considered from both the **pollution and additional cost perspectives**. Very few people are really capable of handling them. It is sad to say but it appears that some manufacturers, in an attempt to gain a competitive edge, are being less than honest regarding the drawbacks in application and expected longevity.

7-5

But another part to this thought process is that the **air dry, solvent-borne resins we use for steel and wood coatings** are made from **renewable resources** – certainly an issue in a world of declining oil reserves. The urethanes, acrylics and epoxies that generally would be used are all derived from crude oil. Certainly this difference is a critical issue if we are looking at the total impact of coatings in a resources consumed/environmental effect model that looks out 50-250 years.

7-6

Enclosures & Attachments

In each product class, I have presented my recommendations, data sheets, MSDS's and recommended VOC levels. In addition I have enclosed a list of people who have been involved in testing and evaluations of product performance with public and private backgrounds. The original discussion outline is included for a quick reference to the issues at hand and to assist with organizing the various areas. A table of contents is also included to assist the organizational efforts.

We look forward to solving these issues to the betterment of all involved. Please give me a call at 858-558-0800 for further discussion on these critical areas of coating technology.

Sincerely,

Lawrence W. Cerenzie

Lawrence W. Cerenzie
Engineering Manager

cc: Bill Reckel, AMTECO
Charles O. Grigsby, Zero-Rust

FSC Coatings

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Comments On Proposed Air Quality Rule Changes From Recent Meeting

List Of Attachments & Enclosures

Section I. Air Dry Phenolic Alkyd Coatings As Superior Maintenance Coatings For Above Grade & Above Waterline Applications

1) Zero-Rust Product Brochure (Bridge Brochure)
2) Zero-Rust Standard Data Sheet (400 g/l)
3) Zero-Rust Military Data Sheet (275 g/l)
4) Akzo Lab Salt Spray Letter @2000 Hours on smooth, brush finished bare steel
5) Salt Spray Comparison Chart Of Zero-Rust vs. Other Maintenance Coatings

7-7

6) [redacted] Comparing Zero-Rust Performance To Current Multi-Component (Epoxy) Industrial & Automotive Primers
7) [redacted] -- Test Cards From Zero-Rust & SA-3 Applied To Rusty Steel
   A) 1600 Hour Weatherometer (92% average gloss retention with Ultimate "UV" Package; about 65% gloss retention with standard "UV" Package)
   B) Enviro-Cabinet (perfect adhesion at 1800 hours on rusty steel -- 50% immersion/50% QUV with varying temperatures)
   C) Humidity Cabinet (perfect adhesion with de-ionized water)
8) Sherwin-Williams Kem-Aqua Data Sheet With Salt Spray Results
9) Zero-Rust and SA-3 Application Procedure For Maintenance Applications
10) SA-3 Silicone Poly Plus Data Sheet
11) Amershield 2 Component Industrial Urethane Data Sheet w/ Direct & Reverse Impact Data
12) References As To Performance Of This Technology:
   A) Mark Nelson -- Senior Architect UCSD Facilities Design
   B) Norris Lindsay --NAVSEA Coatings Testing Laboratory

Section II. Acrylic Lacquers For Exterior & Interior Masonry Floor, Driveway, Warehouse and Roadbase Applications

7-8

1) AWR Super Sealer Data Sheet
2) [redacted]
3) [redacted]

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Section III. Floor Coatings – Urethane & Epoxy Coating Technologies (Incomplete)

1) General Polymers sample specs (note that lower solids primers are required for adhesion purpose)

2) (spec showing beadblasting or sandblasting required).

7-9

3) Bill/Don – Urethanes/Epoxies – performance comparison Molecular Wt vs. Solids?
Note: Jim we are still trying to locate an authoratative discussion on the molecular weight vs. VOC vs. Solids subject. Everyone in the urethane business will discuss it but will not put it down in writing for competive reasons – they want to talk about how they do in comparison to other suppliers products so as not to be hurt in the market place.

4) [redacted]

Section IV. Wood Stains

A). Published Natural Wood Finish, Stains and Preservative Test Data – including top 3 systems in each category.

1) Log Home Guide Article

7-10

2) Log Home Construction & Maintenance Guide

3) Preserving & Maintaining Wood Shakes & Shingles

4) Texas A&M letter on Maintaining Shake Roofs

- water vs. Oil-based coatings – oil-based is the only type that works
- only product recommended based on their testing is Radcon (TWP Shake & Shingle as ready-to-use coating system based on this technology).

B) TWP Product Comparison

C) TWP Product Data Sheets

1) TWP 200 Series

2) TWP 500 Series

3) TWP 300 Series

Section V. Specialty Coatings (Graffiti Control)

A) Graffiti Max Data Sheet

7-11

B) A-B-C's Of Graffiti Control by Lawrence W. Cerenzie

C) [redacted]letter on Graffiti Max performance

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Section VI. Material Safety Data Sheets

A) Zero-Rust (VOC 400 g/l)
B) Zero-Rust (VOC 275 g/l)
C) SA-3 Silicone Poly Plus
D) AWR 2 & 3 Super Sealers -- Acrylic Lacquers
E) New Quick Dry Lacquers (VOC 450 g/l)
F) TWP Shake & Shingle 200 Series (VOC less than 50 g/l)
G) TWP Deck & Furniture 300 Series (VOC 350 g/l)
H) TWP II 500 Series (VOC 350 g/l)
I) Graffiti Max

Section VII. Referrals For Paint & Coatings Performance & Use

A) [redacted]
B)
C)
D)
E)
F)
G)
H)

file: legal/carbus2.199 11/99

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1. Highest Performance Maintenance Primer & Topcoat for Metal.
2. 2400 Hours in ASTM-B117 Salt Fog Testing Without Blistering or Rust Creepage .
3. Penetrates Rust (O.K. To Apply over hand cleaned or tightly adhering rust).
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"Finally, an Easy-To-Use, VOC Compliant Primer & Topcoat That Works!"

ZERO RUST SIMPLY THE BEST

- → Cost Effective
- → Easy Application.
- → Re-coatable (Simply scuff and seal with Zero-Rust).
- → Impermeable "Barrier Coat" Technology.
- → Superior Protection Verified by Independent Salt Spray Testing.
- → Topcoat Not Necessary.
- → Single Component System.
- → Quick Dry — Tack Free in 1 Hour.
- → Environmentally Friendly — Free of Lead, Chromates & Barium.
- → Excellent Coverage Due to High Solids Content.

Outperforms the Competition

• Zero Rust dramatically outperforms all maintenance coatings, including DTM (Direct To Metal) and rust converter type primers

• 2400 hrs. (at 4.5 mils DFT) in the ASTM-B117 Salt Fog Testing without blistering or rust creepage (all other maintenance primers failed to reach 1000 hours with typical industrial coatings failing within 300 hrs. of exposure).

• No lift, blistering or rust creep after 2000 hr. Salt Fog over **RUSTY STEEL** (3.5-4.0 mil DFT over profile).

• Excellent High temperature resistance-up to 350°F (black only).

Penetrates & Controls Rust

• Zero-Rust Penetrates & Encapsulates Rust. Excellent over hand cleaned or tightly adhering rust.

• Perfect for general maintenance, with or without sandblast.

• New "Barrier Coat" Technology blocks moisture, salt & oxygen ions which cause rust. Strong Dielectric Properties insulate steel from electrolysis or galvanic corrosion.

• For Maximum Protection, use black or red oxide as a base coat (2.5-3 mil DFT). For marine or corrosive environments, apply 2 coats of black or red oxide (total 5-6 mil DFT) before topcoating.

Does Not Require a Topcoat

• Can be used as its own topcoat for a Matte-Satin finish. (Note: Zero Rust will eventually chalk in direct sunlight). Apply at 5-6 mil wet over Zero Rust basecoat.

• For High Gloss and Chalk Resistance, Zero-Rust can be top-coated with High Performance SA-3 Silicone Alkyd (excellent), standard enamels (acceptable) or 2 component urethanes (excellent).

Environmentally Friendly

• VOC Compliant at 398 gm/ltr or 3.3 lbs/gal. (Zero-Rust is also available in a 340 gm/lter or 2.8 lbs/gal version). Lower VOC formulas are special order.

• High solids formulation (63% solids by weight) provides excellent coverage.

• Does not contain barium, lead or corrosion inhibitors such as chromates.

Easy-To-Use

• Single Component - No mixing of parts and no "Pot-Life" worries with Zero-Rust.

• Simply stir and apply — Paint thinner cleanup.

• Airless sprayer, brush, or roller applied.

• Re-coat in 1 hour for spray and 4 hours for brush and roll. Available in spray cans for easy touch-up.

• Spread Rate: 5-6 mil wet over profile at 250-300 sq. ft./gal. (provides 2.5-3.0 mils DFT.) For maximum durability, apply 2 coats (5-6 mils DFT).

• Easy Maintenance/touch-up — Simply sand lightly and apply Zero-Rust.

Great For All Uses!

• **AUTOMOTIVE & AGRICULTURAL:** Auto Body, Trailers, Fasteners, Frames, Tractors, Farm Implements & Spreaders.

• **MARINE:** Boats, Barges, Docks, Piers, Railings, Metal Decks & Trailers. (Above water line only).

• **COMMERCIAL & INDUSTRIAL:** Tanks, Structural Steel, Piping (Black to 350° F), Pipe Supports, Decks, Bridges, Heavy Equipment, Benches, Rebar & Valves.

• **RESIDENTIAL:** Cars, Boats, Trailers, Metal Railings, Yard Equipment, Barbecues (black only), Shelving and Pool Equipment.

FSC Coatings, Inc.
5360 Eastgate Mall, Suite "F"
San Diego, CA 92121

FSC Coatings

Coatings Engineered For Ultimate Performance

Product Data Sheet

Zero-Rust®

VOC Compliant Phenolic Alkyd Primer Coating

Product Description:

Zero-Rust® is a truly high performance, easy to use, ferrous metal maintenance primer coating. **Zero-Rust®** field and lab performance is superior to that of all common maintenance primers, Water-borne DTM coatings, Waterborne epoxies and common maintenance epoxies in non-immersion applications. Independent testing has shown the single component **Zero-Rust®** to **exceed 2,000 hours ASTM B-117 Salt Spray testing over smooth, unprofiled surfaces with zero scribe creep** at 3-4 mils DFT (Dry Film Thickness). Similar results have been achieved over pre-rusted panels as well. Our Black **Zero-Rust®** has excellent high temperature properties (up to 350 degrees F) as evidenced by its use on geothermal plants, Vandenberg Missile Launch Facilities (Air Force) and on the shipboard missile hatch doors (U.S. Navy).

Great for application over **hand and power tool cleaned surfaces** as well as blasted surfaces. The composition is **free of heavy metals and does not pose environmental problems** should eventual removal of coating by sandblasting occur. Zero-Rust® is designed primarily as a barrier coating with special emphasis on water resistance and is free of conventional metallic rust inhibitive pigments. This product contains none of the components currently on the EPA banned list or future "hit list".

While we focus on the maintenance uses, **Zero-Rust® makes an excellent Original Equipment Manufacturer "OEM" coating** and is routinely used on **new trailers, new structural steel, new oilfield wellheads & manifolding, new mining equipment, new pump & manifold systems, new power generation skids and new tanks.**

Special Military Standard Formulation

Special Military Standard version for use by U.S. Military is available exclusively from FSC Coatings. This Zero-Rust® material will have special MSN's to identify its unique low VOC and much faster dry characteristics. These Military Standard coatings are currently being used by the U.S. Marine Corps and the U.S. Navy for maintenance applications on ships, vehicles, tools and equipment. The decision to use Zero-Rust® by the military follows almost 4 years of comparative military lab and field testing studies.

Common Zero-Rust Applications

Military Vehicles & Equipment	Offshore Platforms	Fencing & Security Screens
Barges & Ships	Refineries & Pipelines	Metal Buildings & Roofing
Seattle Port Authority	Oil & Gas Processing Equip.	Power Generation Skids
Water Treatment Plants	Mining & Smelting Facilities	Dump Trucks
Tank & Bridges	Vehicles & Trailers	Food Processing Plants
Geothermal Piping (to 350°)	Waste Haulers & Dumpsters	Piping / Structural Steel
		Heavy Equipment Recoats

Minimal Surface Preparation Required

Excellent for application over hand tool & power tool cleaned surfaces with tightly adhering rust. Ideal for general maintenance when unable to sandblast. Incorporation of **Prep Step™** recommended in these instances to loosen rust for faster removal and to enhance surface adhesion. As with all coatings, grit-blasted or sandblasted surfaces will yield the maximum possible longevity.

Can Be Topcoated With Water-borne & Solvent-borne Systems For Exterior Uses And Corrosive Services -- Zero-Rust® may be topcoated with most generally available finish coat systems. For maximum longevity in high UV exterior exposures, we recommend the use of SA-3 Silicone Poly Plus™ and our family of "Super Urethanes". Time windows do exist for recoating Zero-Rust® with itself or other coating materials. Contact FSC for guidance as these windows vary depending on the type of coating and the carrier system involved. However, Zero-Rust® can always be recoated after full cure (5 days) by scuff sanding first to obtain a little "tooth" and then reapplying more Zero-Rust® or SA-3 Silicone Poly Plus™.

Zero-Rust® may also be recoated with the clear Crystal Coat® topcoat which has a boosted "UV" protection package built into the coating to protect itself and the underlying Zero-Rust® from damaging "UV" rays.

Product Performance Testing:
Zero-Rust® has exceeded 2,000 hours salt spray resistance over smooth, brush finished bare steel and pre-rusted panels with 0-1/64" of scribe creep -- unmatched primer adhesion performance. Similar results are achieved on pre-rusted steel panels. The Zero-Rust® performance exceeds that of commonly used red oxide, DTM Acrylics, water-borne alkyds and epoxies on these types of surfaces. Zero-Rust® performance has been confirmed by industrial, commercial, marine and military users. The longest test run to date was 2,450 hours in ASTM B-117 testing with zero scribe creep -- outstanding performance. Black and Red Oxide Zero-Rust® are recommended as the primers for corrosive services -- including marine, coastal and industrial surfaces.

Application: Airless, HVLP and conventional spray or brush and roll. Use 0.015-0.017 tip when applying with airless spray (smaller tip when spraying narrow or small parts). Remember, it takes 2-3 coats by brush and roll to equal one spray coat in dry film millage. Always follow safety rules associated with solvent borne, flammable products.

PHYSICAL PROPERTIES:

Weight Per Gallon:	10.80/lb	Viscosity:	74-84 KU
Non Volatile Veh :	34.39%	Non Volatile (wt):	68.73%
Non Volatile(vol):	53.60%	% Pigment:	34.34%

Dry Time: 5-6 mils wet--one hour set to touch at 70° F & 50% Relative Humidity when spray applied.

Recoat: 1 hour for spray at 70 degrees F and 50% Relative Humidity. Overnight for brush and roll.

VOC (Volatile Organic Content): Three VOC's are currently available depending upon your corporate needs and air control district regulations -- 275 g/l (Military Standard), 340 g/l & 400 g/l.

Spread Rate: 5-6 mils wet at 250-300 ft² per gallon per coat (theoretical). This spread rate will provide a minimum 2.5 mils Dry Film Thickness (DFT) over smooth profile. When applying over rough or profiled surfaces, additional coating will be required to achieve the minimum 2.5 mils DFT over the peaks or sharpest edges. All steel surfaces should receive a minimum of 2 coats of coating to achieve the desired resistance against moisture and salt penetration. This may consist of 2 coats of Zero-Rust®, or one coat of Zero-Rust® and one coat of desired finish. As in any situation where maximum corrosion resistance is required, experience has shown that a minimum of 5-6 mils DFT is required for extended longevity over steel substrates with blast or rust profile.

Reduction and Clean-up: No reduction is needed for airless spray. For conventional and HVLP sprayers, use ZR Thinner only. Clean-up with ZR Thinner. ZERORUSTPDS–DEC 1999 Rev I

Manufactured By: Amteco
Technical Information & Sales: FSC Coatings (fsccoatings.com) (800) 579-8459

Text Copyrighted December 1999—Lawrence Cerenzie

FSC Coatings -- 5360 Eastgate Mall Rd. Suite F, San Diego, Ca. 92121 -- 858-558-0800 -- Fax: 858-558-2159

FSC Coatings

Coatings Engineered For Ultimate Performance

Product Data Sheet

Zero-Rust® Military Standard

VOC Compliant Phenolic Alkyd Primer Coating

Product Description:

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Great for application over **hand and power tool cleaned surfaces** as well as blasted surfaces. The composition is **free of heavy metals and does not pose environmental problems** should eventual removal of coating by sandblasting occur. Zero-Rust® is designed primarily as a barrier coating with special emphasis on water resistance and is free of conventional metallic rust inhibitive pigments. This product contains none of the components currently on the EPA banned list or future "hit list".

While we focus on the maintenance uses, **Zero-Rust® makes an excellent Original Equipment Manufacturer "OEM" coating** and is routinely used on **new trailers, new structural steel, new oilfield wellheads & manifolding, new mining equipment, new pump & manifold systems, new power generation skids and new tanks.**

Special Military Standard Formulation With Military Applications

The **Zero-Rust® Military Standard Series** was developed to meet a lower mandated VOC emissions target as well as to be faster dry to allow quicker recoat times for faster field repairs. The **Cammy Tops™ Camouflage Topcoats** and **SA-3 Silicone Poly Plus™ with LSA** (Low Solar Absorption) pigments are designed to bond perfectly with the **Zero-Rust® Military Standard Coatings**. We recommend **Zero-Rust®** Black and Red Oxide as primers for all military applications because of their extended temperature use range, superior adhesion and superior corrosion resistance.

Significant to these formulations, dry to touch is normally 10 minutes or less at 70° F versus 20-25 minutes for our standard formulas. In addition, the **Zero-Rust® Military Standard** can usually be recoated within 30 minutes, which is less than 50% of the normal recoat window. Markedly improved recoat, cure rate and dry time properties are obtained without sacrificing performance--all important benefits to the military for infield and shop repairs.

Superior Performance In Military Applications When Compared to Other Mil-Spec Primers

In lab and field testing, **Zero-Rust® Military Standard** has been shown to outperform all other military specified primers on marginally prepared surfaces—the normal field and shop conditions. See letter dated October 1998 from Top Dlapa reporting on the Marine Corps 2 year Test Program where this performance is clearly documented. Easier and longer lasting field or shop recoats and coating repair operations are tremendous time and money saving benefits to all military users.

Product Performance Testing:

Zero-Rust® has exceeded 2,000 hours salt spray resistance over smooth, brush finished bare steel and pre-rusted panels with 0-1/64" of scribe creep -- unmatched primer adhesion performance. Similar results are achieved on pre-rusted steel panels. The Zero-Rust® performance exceeds that of commonly used red oxide, DTM Acrylics, water-borne alkyds and epoxies on these types of surfaces. Zero-Rust® performance has been confirmed by industrial, commercial, marine and military users. The longest test run to date was 2,450 hours in ASTM B-117 testing with zero scribe creep -- outstanding performance. Black and Red Oxide Zero-Rust® are recommended as the primers for corrosive services -- including marine, coastal and industrial surfaces.

Health Safety Benefits Over Other Mil-Spec Primers

Zero-Rust® Military Standard offers significant health safety benefits over all other high performance primers. Normally high performance in the coating industry indicates urethanes or epoxies which are known "body tissue reactive" materials and therefore cancer causing. The epichlorohydrins and isocyanates all react with water or –OH groups present in all internal & external body tissues. **Zero-Rust® Military Standard** does not contain any of these components – it is totally non-reactive to body tissues making applications safer, easier and less complicated. Field personnel can feel better about applying these materials knowing of their inherent safety to themselves and others--truly a win-win for everyone.

Common Zero-Rust Applications

Military Vehicles & Equipment	Offshore Platforms	Fencing & Security Screens
Barges & Ships	Refineries & Pipelines	Metal Buildings & Roofing
Seattle Port Authority	Oil & Gas Processing Equip.	Power Generation Skids
Water Treatment Plants	Mining & Smelting Facilities	Dump Trucks
Tank & Bridges	Vehicles & Trailers	Food Processing Plants
Geothermal Piping (to 350°)	Waste Haulers & Dumpsters	Piping / Structural Steel
		Heavy Equipment Recoats

Minimal Surface Preparation Required

Excellent for application over hand tool & power tool cleaned surfaces with tightly adhering rust. Ideal for general maintenance when unable to sandblast. Incorporation of **Prep Step™** recommended in these instances to loosen rust for faster removal and to enhance surface adhesion. As with all coatings, grit-blasted or sandblasted surfaces will yield the maximum possible longevity.

Can Be Topcoated With Water-borne & Solvent-borne Systems For Exterior Uses And Corrosive Services

-- Zero-Rust® may be topcoated with most generally available finish coat systems. For maximum longevity in high UV exterior exposures where topcoats are required, we recommend the use of SA-3 Silicone Poly Plus™, our family of "Super Urethanes", MaxLife™ Water-borne Acrylics or Cammy Top™ Topcoats. Time windows do exist for recoating Zero-Rust® with itself or other coating materials. Contact FSC for guidance as these windows vary depending on the type of coating and the carrier system involved. However, Zero-Rust® can always be recoated after full cure (5 days) by scuff sanding first to obtain a little "tooth" and then reapplying more Zero-Rust® or the appropriate topcoat from the above selection.

Zero-Rust® may also be recoated with the clear Crystal Coat® topcoat which has a boosted "UV" protection package built into the coating to protect itself and the underlying Zero-Rust® from damaging "UV" rays.

Application: Airless, HVLP and conventional spray or brush and roll. Use 0.015-0.017 tip to apply with airless spray (smaller tip when spraying narrow or small parts). Remember, it takes 2-3 coats by brush and roll to equal one spray coat in dry film millage. **Follow safety rules associated with solvent borne, flammable products!**

PHYSICAL PROPERTIES:

Weight Per Gallon:	10.80/lb	Viscosity:	74-84 KU
Non Volatile Veh :	34.39%	Non Volatile (wt):	68.73%
Non Volatile(vol):	53.60%	% Pigment:	34.34%

Ultra-Low VOC (Volatile Organic Content): 275 grams / liter

FSC Coatings -- 5360 Eastgate Mall Rd. Suite F, San Diego, Ca. 92121 -- 858-558-0800 -- Fax: 858-558-2159

Dry Time: 5-6 mils wet—25-30 minutes set to touch at 70° F & 50% Relative Humidity when spray applied.

Recoat: 25-30 minutes for spray at 70° F and 50% Relative Humidity. Longer at lower temperature or higher humidity. Overnight for brush and roll.

Spread Rate: 5-6 mils wet at 250-300 ft² per gallon per coat (theoretical). This spread rate will provide a minimum 2.5 mils Dry Film Thickness (DFT) over smooth profile. When applying over rough or profiled surfaces, additional coating will be required to achieve the minimum 2.5 mils DFT over the peaks or sharpest edges. All steel surfaces should receive a minimum of 2 coats of coating to achieve the desired resistance against moisture and salt penetration. This may consist of 2 coats of **Zero-Rust®**, or one coat of and one coat of desired finish. For Naval or coastal uses where maximum corrosion resistance and longevity is required, experience has shown that a minimum of 5-6 mils DFT (2 coats of black or red oxide **Zero-Rust®**) is required for extended longevity over steel substrates with blast or rust profile.

Reduction and Clean-up: No reduction is needed for airless spray. For conventional and HVLP sprayers, use ZR Thinner only. Clean-up with ZR Thinner.

NSN Numbers: Although not assigned to date, the Marine Corps is arranging for NSN numbers to be assigned ASAP. **Zero-Rust® Military Standard** can be purchased using the following special Military Part Number Nomenclature.

Zero-Rust® Military Standard Part Numbers

	Spray Cans	1 Gallon Can	5 Gallon Pail
Black	**FMSZR20S**	**FMSZR20G**	**FMSZR20P**
Red Oxide	**FMSZR21S** (special order)	**FMSZR21G**	**FMSZR21P**
Grey	**FMSZR22S** (special order)	**FMSZR22G**	**FMSZR22P**
White	**FMSZR25S** (special order)	**FMSZR25G**	**FMSZR25P**

Below are special order items. Minimum order is 1200 spray cans or 50 gallons in 1's or 5's.
Not recommended for extended exterior exposures (without topcoat).

Cat Yellow	**FMSZR23S**	**FMSZR23G**	**FMSZR23P**
Green	**FMSZR24S**	**FMSZR24G**	**FMSZR24P**
Tan	**FMSZR26S**	**FMSZR26G**	**FMSZR26P**
Safety Blue	**FMSZR30S**	**FMSZR30G**	**FMSZR30P**
Safety Red	**FMSZR31S**	**FMSZR31G**	**FMSZR31P**
Safety Yellow	**FMSZR32S**	**FMSZR32G**	**FMSZR32P**

NOTE: For exterior use, it is recommended that the "black" or "red oxide" Zero-Rust® Military Standard be applied as a primer coat with the appropriate topcoat applied. Zero-Rust® will eventually chalk in direct sunlight. Zero-Rust® must be topcoated with our "UV" stable topcoats: SA-3 Silicone Poly Plus™, Cammy Top™ Topcoats, Super Urethanes or Maxlife™ Water-borne System to maintain proper color.

Manufactured By: Amteco

Technical Information & Orders: FSC Coatings at 800-579-8459 (fsccoatings.com)

Text Copyrighted December 1999—Lawrence Cerenzie

AKZO NOBEL

Resins

Mr. William L. Reckel
President
Amteco Inc.

Dear Mr. Reckel:

Enclosed are the results from the most recent salt spray corrosion study on the "ZERO-RUST" products and experimental variations thereof.

Over the hundreds of panels checked over the last two years, it has become increasingly clear that dry film thickness is extremely important over bare steel. This last series of tests certainly meets your objectives of achieving 2000+ hour performance on smooth brush finished bare steel panels at 3.2 to 4 mil. dry film thickness one coat applications.

There were seven red oxide formulations, including the 28-60 Red Oxide "ZERO RUST" control. The results indicate continuing progress in optimizing performance characteristics within the framework of the basic barrier coat design. With the control designated as 28-60 #1, 28-80 #2,5,6,&7 show equal or better performance to 28-60 #1 Control at 2016 hours. As anticipated, the 28-60 #2 should be the final standard production item. Number 5,6 & 7 merely showed the ability to lower VOC's without sacraficing performance.

The two 28-62 Black "ZERO RUST formulations gave outstanding results at 2016 hours.

TEST RESULTS: ASTM B 117-63, 5% SALT SPRAY, 3-4 MIL. DFT on CRS.

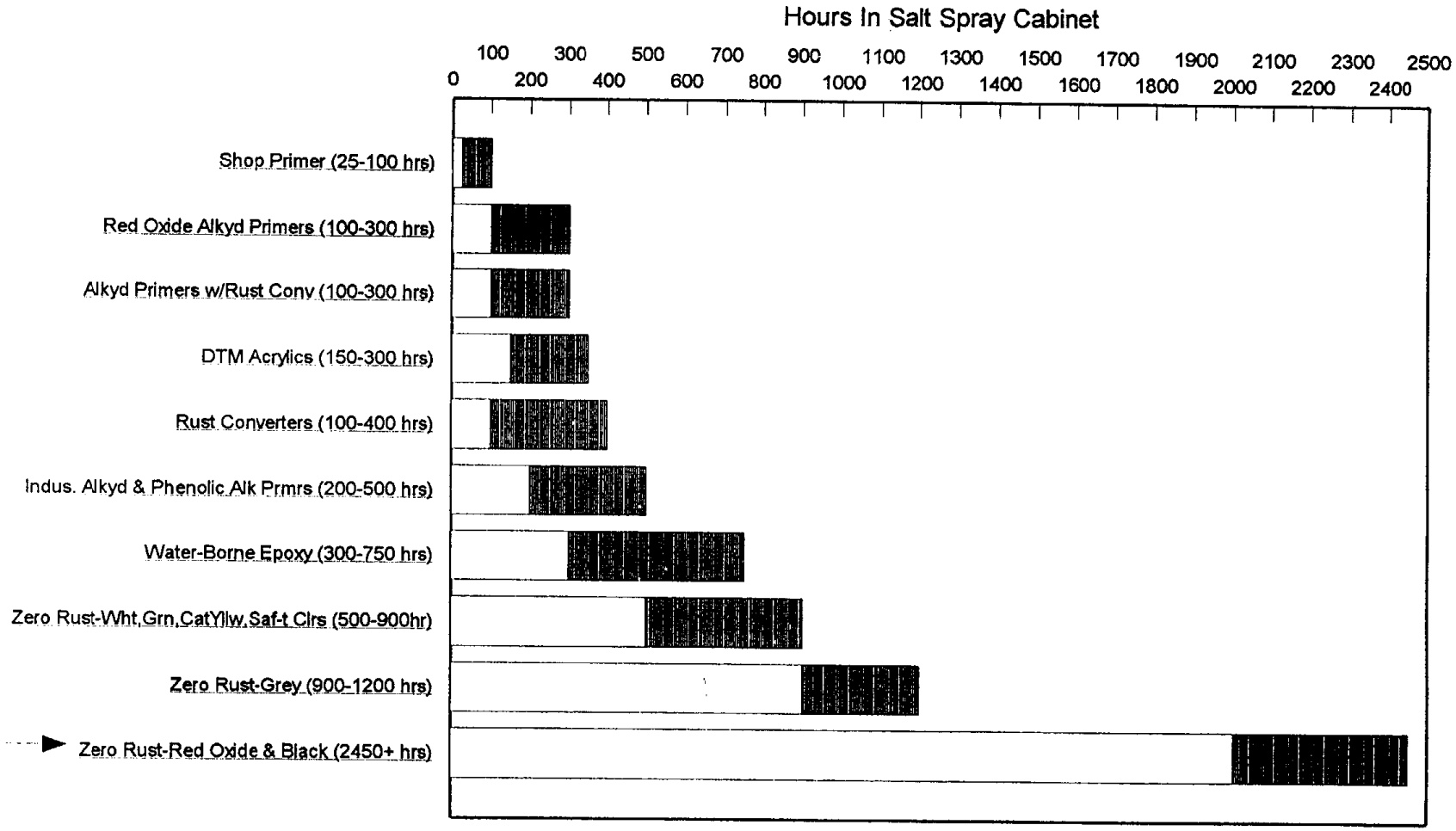
2016 hrs.	Field Rust	Field Blisters	Scribe Blisters/Creep
Red Oxide			
28-60 #1	none	F #1	F#2 1/8"
28-60 #2	none	none	1#1 1/32-1/16"
28-60 #5	none	F#2 in corner	VF#2 9/32-1/4 "
28-60 #6	none	F#1	F#4 0-1/8 "
28-60 #7	none	few top & bottom	F#4 0-1/64 "
Black			
28-62 #8	none	VF #1	F#2 0-1/64 "
28-62 #9	none	none	VF#6 0

Best Regards,

Don Gibson
Product Laboratory Manager

SALT FOG TEST RESULTS

Based on ASTM B-117 Salt Spray Testing



Zero Rust Tests performed by Akzo Nobel Lab on:
Sand Blasted, Smooth, & Pre-rusted Steel

[redacted]

4790
MMO
22 Oct 98

MEMORANDUM

From: Corrosion Control Officer, I Marine Expeditionary Force
To: Lawrence Cerenzie, Engineering Manager, FSC Coatings, 5360 Eastgate Mall Road, Suite F, San Diego, Ca. 92127

Subj: ZERO RUST

1. For the past two years I MEF has conducting field testing of ZERO RUST for possible use in the Marine Corps, Corrosion Prevention and Control Program (CPAC), as requested by the CPAC WG. The products evaluated had to be user friendly, low VOC, environmentally compliant and resistant to the corrosive enviroment in which we deploy.

2. Initial test results have proven Zero Rust to be more reliable than the current 2 part primers applied at the organizational level. In an on going efforts to reduce the expenditure of our resources, yet maintain our equipment in the fleet while in garrison and deployed it was requested that FSC determine the feasibility of providing Zero Rust top / base coat in the standard cami patterns colors indicated below.

Color		Mil standard
Green	383	34094
Brown	383	30051
Tan	686	33446
Black		37030
Sea Foam Green		

3. The first color match samples when dried had too much sheen, minus Sea Foam Green but maintained the correct color and texture. Based on our last meeting these colors matches when produce are acceptable for use as a base coat in the organizational Corrosion control and the spot paint program.

4. The formulation of Zero Rust as a top coat must be addressed by different DOD activities due to the infra red and chemical resistance signatures required.

[redacted]

WEATHER-OMETER RECORD #3

NAME OF FINISH: Amteco Architectural Coatings
DESCRIPTION OF SAMPLE: SA-3 Zero Rust Silicone Alkyd
PRIMER: over Zero Rust Primer over Prep Step Treatment (Rusty Panels)
COATS: ____ MILS: ____
CYCLE CAM USED: NO. 7
BLACK PANEL TEMPERATURE: 140° F (Black) White

SAMPLE # 4953
COMPLETED TEST #
START DATE 11/13/97
FINISH DATE 8/25/97
ACCEPTABLE: YES ☐ NO ☐

CONDITION	GLOSS	REFL	TIME METER READING START	FINISH	HOURS	DAYS 10:1
	75	95				
Good Condition	67	93	5383	5783	400	250 Days
Very Slight Darkening	70	93		6183	800	500 "
" "	68	93		6583	1200	750 "
Slight Darkening	66	94		6983	1600	1000 "

88% gloss Retention

START AND FINISH TIME RECORD
READING AT FINISH 6983
READING AT START 5383
TOTAL LIGHT HOURS 1600

FORM 368 4-90

WEATHER-OMETER RECORD #3

NAME OF FINISH: Amteco Architectural Coatings
DESCRIPTION OF SAMPLE: SA-3 Zero Rust Silicone
PRIMER: Alkyd
COATS: 2 MILS: ____
CYCLE CAM USED: NO. 7
BLACK PANEL TEMPERATURE: 140° F White

SAMPLE # 4945
COMPLETED TEST #
START DATE 11/13/97
FINISH DATE 8/25/97
ACCEPTABLE: YES ☐ NO ☐

CONDITION	GLOSS	REFL	TIME METER READING START	FINISH	HOURS	DAYS 10:1
	75	94				
Good Condition	68	94	5383	5783	400	250 Days
" "	67	93		6183	800	500 "
Very Slight Darkening	68	94		6583	1200	750 "
" "	68	94		6983	1600	1000 "

91% gloss Retention

START AND FINISH TIME RECORD
READING AT FINISH 6983
READING AT START 5383
TOTAL LIGHT HOURS 1600

ENVIROTEST CABINET RECORD

NAME OF FINISH Amteco Architectural Coatings
DESCRIPTION OF SAMPLE SA-3 Zero Rust Silicone
PRIMER: Alkyd over Zero Rust Primer over Prep Step Treatment (Rusty Panels)
COATS: ____ MILS: ____
IMMERSION LIQUID ____
TEMPERATURE: ____ (White)

SAMPLE # 706 W/X
COMPLETED TEST # ____
START DATE 11/13/97
FINISH DATE 9/22/97
ACCEPTABLE: YES ☐ NO ☐

CONDITION	TIME METER READING START	FINISH	HOURS	SCR SETTIN(
Heavy Rust X - Slight Darkening	29970	30465	495	
" " - Slight-moderate Darkening		30873	903	
Heavy Rust - Moderate Darkening		31828	1359	
Heavy Rust X - Heavy Darkening		31801	1831	
↑ Rust in scribe only - no lift or creep				

FORM 1361 R11/82

WEATHER-OMETER RECORD # 3

NAME OF FINISH Amteco Architectural Coatings
DESCRIPTION OF SAMPLE SA-3 Zero Rust Silicone Alkyd
PRIMER: over Zero Rust Primer over Prep Step Treatment (Rusty Panels)
COATS: ____ MILS: ____
CYCLE CAM USED: NO. 7
BLACK PANEL TEMPERATURE: 140°F (Black) White

SAMPLE # 4955
COMPLETED TEST # ____
START DATE 11/13/97
FINISH DATE 8/25/97
ACCEPTABLE: YES ☐ NO ☐

CONDITION	GLOSS 79	REFL 93	TIME METER READING START	FINISH	HOURS	DAYS 10:1
Good Condition	75	93	5383	5783	400	250 Days
Very Slight Darkening	76	92		6183	800	500 "
" "	79	92		6583	1200	750 "
Slight Darkening	76	93		6983	1600	1000 "

77% gloss retention

START AND FINISH TIME RECORD
READING AT FINISH 6983
READING AT START 5383
TOTAL LIGHT HOURS 1600

ENVIROTEST CABINET RECORD

NAME OF FINISH Amteco Architectural Coatings
DESCRIPTION OF SAMPLE 28-62 Zero Rust Primer
PRIMER over Prep Step Gel Rust Dissolver
COATS: ____ MILS: 5-6 (Rusty Panels)
IMMERSION LIQUID ____
TEMPERATURE: (Black)

SAMPLE # 701
COMPLETED TEST # ____
START DATE 1/13/97
FINISH DATE 9/22/97
ACCEPTABLE: YES ☐ NO ☐

CONDITION	TIME METER READING START	FINISH	HOURS	SCR SETTING
	29970	30465	495	
Surface Etching – Slight Fade		30873	903	
" " – Moderate Fade		31328	1358	
" " – Heavy Fade – lt Rust @ Hole		31801	1831	
Moderate Alligatoring Surface – Heavy Fade – light Rust @ Hole				

FORM 1291 R11/92

ENVIROTEST CABINET RECORD

NAME OF FINISH Amteco Architectural Coatings
DESCRIPTION OF SAMPLE 28-62 Zero Rust Primer
PRIMER: over Prep Step Gel Rust Dissolver
COATS: ____ MILS: 5-6 (Rusty Panels)
IMMERSION LIQUID ____
TEMPERATURE: (Black)

SAMPLE # 700 w/X
COMPLETED TEST # ____
START DATE 1/13/97
FINISH DATE 9/22/97
ACCEPTABLE: YES ☐ NO ☐

CONDITION	TIME METER READING START	FINISH	HOURS	SCR SETTING
	29970	30465	495	
Rust All X – Slight Fade – Surface Alligatoring		30873	903	
" " – Moderate Fade – " "		31328	1358	
" " – Heavy Fade – " "		31801	1831	
Heavy Rust X – Heavy Fade – Moderate Alligatoring on Surface				

FORM 1291 R11/92

Alligatoring – coating applied too heavy; passed anyway

FEB 08 99 08:02AM

HIGH HUMIDITY RECORD

PRODUCT NAME: AMTECO ARCHITECTURAL COATINGS
PRODUCT DESCRIPTION: 5A-3 ZERO RUST SILICONE ALKYD
PRIMER: NO PRIMER
COATS: 2 MILS:
ACCEPTABLE: YES ☐ NO ☐
REMARKS:

ACTIVE SAMPLE #
COMPLETED SAMPLE#
INSTALLED: 9/23/97 REMOVED: 1/22/98
LENGTH OF TIME: 4 months

DATE	CONDITION
9/24/97	RUST 30% X- SURFACE GOOD CONDITION
9/25/97	RUST 35% X- " " "
9/30/97	LIGHT RUST 50% X- SURFACE GOOD CONDITION
10/6/97	LIGHT RUST 75% X- SURFACE GOOD CONDITION
10/15/97	" " " "
10/23/97	LIGHT RUST 90% X- DARK SPOTTING ON SURFACE
11/13/97	LIGHT RUST ALL X- " " "
11/24/97	" " " "
12/5/97	" " " "
12/23/97	" " " "
1/5/98	NOT EVALUATED
1/12/98	RUST ALL X- SURFACE SPOTTING- SLIGHT DISCOLORATION

OVER

FORM 1398 7/91

no scribe creep, only rust in the scribe

HIGH HUMIDITY RECORD

PRODUCT NAME: AMTECO ARCHITECTURAL COATINGS
PRODUCT DESCRIPTION: 2S-62 ZERO RUST PRIMER OVER RUSTY PANEL
PRIMER:
COATS: 1 MILS:
ACCEPTABLE: YES ☐ NO ☐
REMARKS:

ACTIVE SAMPLE #
COMPLETED SAMPLE#
INSTALLED: 9/23/97 REMOVED: 1/22/98
LENGTH OF TIME: 4 months

DATE	CONDITION
9/24/97	LIGHT RUST 70% X- SURFACE GOOD CONDITION
9/25/97	RUST 70% X- SURFACE GOOD CONDITION
9/30/97	RUST 75% X- " " "
10/6/97	RUST 80% X- " " "
10/15/97	" " " "
10/23/97	RUST 95% X- " " "
11/13/97	RUST 95% X- " " "
11/24/97	RUST 98% X- " " "
12/5/97	" " " "
12/23/97	" " " "
1/5/98	NOT EVALUATED
1/12/98	RUST ALL X- SURFACE IN GOOD CONDITION

OVER

FORM 1398 7/91

primer only has perfect adhesion on rusty steel

233-8373

SHERWIN WILLIAMS CHEMICAL COATINGS

CC-A22

Kem Aqua® 70P Water Reducible Metal Primer

Black	E61B571
Gray	E61A570
White	E61W573
Red Oxide	E61R572

DESCRIPTION

Kem Aqua 70P Water Reducible Metal Primers are fast drying primers for general industrial use on steel either as a single shop coat or as the primer for Kem Aqua 280 Water Reducible Enamels. They offer VOC compliance, excellent corrosion resistance, early water resistance, and no flash point.

Advantages:

- VOC complying 2.8 lb/gal - low solvent emissions
- Fast air drying
- Excellent corrosion resistance
- Good early moisture resistance
- Excellent adhesion to untreated clean metal, both cold and hot rolled steel
- Reduces with water - means considerable cost savings in solvents
- Free of lead and chromate hazards
- No flash point - reduced fire hazards - possible lower insurance rates
- No critical recoat time when topcoated with Kem Aqua 280 Water Reducible Enamel
- Application by various spray methods
- Lower odor improves working conditions
- Water can be used for cleanup of spray guns and other equipment
- Complete water system with Kem Aqua 280 Water Reducible Enamels
- May be topcoated with solvent based air drying enamels

CHARACTERISTICS

Gloss: Flat
Volume Solids: 36 ± 2%
may vary by color
Viscosity:
as packaged
35-50 seconds #5 Zahn Cup
80-90 Krebs Units
reduced 7% with water
25-35 seconds #3 Zahn Cup
Recommended film thickness:

Mils Wet	3.0 - 3.9
Mils Dry	1.0 - 1.3

Spreading Rate (no application loss)
@ 1 mil dft: 580 sq ft/gal
Drying (1.0 mils dft, 77°F, 50% RH):

To Touch:	30-45 minutes
To Handle:	60-90 minutes
Tack Free:	45-60 minutes
To Recoat:	30-60 minutes
To Pack:	overnight
Force Dry:	15-30 minutes at 150-180°F

Good air movement and humidity control are necessary for proper drying of water reducible coatings.

Flash Point:	none - Seta Flash
pH:	8.5 - 8.9
Package Life:	1 year, unopened

Air Quality Data:
Non-photochemically reactive
Volatile Organic Compounds (VOC)
as packaged, maximum, minus water
2.8 lb/gal, 336 g/L
reduced 10% with water:
2.8 lb/gal, 336 g/L

Volatile Organic Emissions
as packaged, maximum
1.6 lb/gal, 192 g/L

An Air Quality Data Sheet is available from your local Sherwin-Williams facility.

SPECIFICATIONS

General: Substrate should be free of grease, oil, dirt, fingerprints, drawing compounds, any contamination, and surface passivation treatments to ensure optimum adhesion and coating performance properties. Consult Metal Preparation Brochure CC-T1 for additional details.

Aluminum: If untreated, prime with Industrial Wash Primer, P60G2, or Kem Aqua Wash Primer, E61G520.

Galvanized Steel: If untreated, prime with Industrial Wash Primer, P60G2, or Kem Aqua Wash Primer, E61G520.

Steel or Iron: Remove rust, mill scale, and oxidation products. For best results, treat the surface with a proprietary surface chemical treatment of zinc or iron phosphate to improve corrosion protection.

Testing: Due to the wide variety of substrates, surface preparation methods, application methods, and environments, the customer should test the complete system for adhesion and compatibility prior to full scale application.

continued on back

APPLICATION

Typical Setups

Water reducible enamels must be applied at higher viscosities than solvent based enamels. They apply and atomize easier at higher viscosities. Do not over reduce.

Conventional Spray:
Air Pressure ..... 50 psi
Fluid Pressure ..... 8-12 psi
Cap/Tip 765/FF
Reducer ..... water
Reduction ..... as needed up to 10%

Airless Spray:
Pressure ..... 1400-2500 psi
Tip ..... .011"
Reducer ..... water
Reduction ..... as needed up to 10%

Air Assisted Airless:
Atomizing Air ..... 20-30 psi
Fluid Pressure ..... 600-900 psi
Cap/Tip ..... .011" - .013"
Reducer ..... water
Reduction ..... as needed up to 10%

HVLP:
Gun ..... Binks Mach 1
Air Pressure ..... 80-90 psi
Fluid Pressure ..... 8-10 psi
Cap/Tip ..... #97P/91
Reducer ..... water
Reduction ..... as needed up to 5%

Dip:
Reducer ..... water
Reduction ..... 25-35 seconds Zahn 3
a 3:1 blend of water and Butyl Cellosolve, R6K25 is necessary for tank maintenance. Monitor and adjust tanks for viscosity, pH (8.5-8.9), and stability.
Excessive agitation or turbulence on part immersion or withdrawal may cause foaming.

Cleanup:
Use water when wet. If dried, clean with Butyl Cellosolve or MIBK.
Follow manufacturer's safety recommendations when using any solvent.

SPECIFICATIONS

Product limitations:

- Package stability is 12 months. Indoor storage at 35-95°F is recommended.
- Higher relative humidity will increase dry time.
- Do not spray at air temperatures below 45°F.
- Topcoat with Kem Aqua 280 Water Reducible Enamel or other water reducible air drying alkyd enamels. Do not topcoat with latex coatings.
- May be topcoat with solvent based alkyd enamels after 24-48 hours air dry.
- Liquid water reducible coatings may cause corrosion/rusting in the presence of steel. Tanks, containers, piping, and application equipment should be lined, stainless steel, or plastic.
- Heavier film thickness will give slower dry time and higher gloss. Follow recommended film thickness for optimum performance.

Performance Tests
Substrate: clean, cold rolled steel
Primer: @ 1.0 - 1.3 mils dft

Salt Spray Test ..... 240 hours
Freeze/Thaw Cycles ..... 4 cycles

CAUTIONS

Thoroughly review product label for safety and cautions prior to using this product.
A Material Safety Data Sheet is available from your local Sherwin-Williams facility. Please direct any questions or comments to your local Sherwin-Williams facility.

LABEL CAUTION
SEE CONTENTS STATEMENT ON LABEL.
VAPOR HARMFUL. Use only with adequate ventilation. Wear an appropriate properly fitted vapor/particulate respirator (NIOSH/MSHA approved) during and after application, unless air monitoring demonstrates vapor/mist levels are below applicable limits. Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.
SPILL AND WASTE: Remove all sources of ignition. Ventilate and remove with inert absorbent. Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulation regarding pollution.
DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Contains solvents which can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal. Contains Ethylene Glycol Monobutyl Ether which may cause blood damage.
WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN. FOR INDUSTRIAL USE ONLY. SEE MATERIAL SAFETY DATA SHEET.

Note: The information, rating, and opinions stated here pertain to the material currently offered and represent the results of tests believed to be reliable. However, due to variations in customer handling and methods of application which are not known or under our control, The Sherwin-Williams company cannot make any warranties as to the end result.

FSC COATINGS – Coatings Engineered For Ultimate Performance
Phone: (858) 558-0800 or (800) 579-8459 **Fax: (858) 558-2159**

Application Procedure For ZERO-RUST® Primer & SA-3 SILICONE ALKYD Top Coat

For NEW Structural Steel, Piping and Flat Steel Surfaces

1) **Commercial blast all metal surfaces** (including nuts & bolts) to remove rust, shop primers, slag, other contamination & mill scale. Apply **Prep Step® Concentrate diluted 1 part with 8 parts water** as a rinse to remove sandblast residue and to **"hold"** the blast pattern for coating.

NOTE: A) Complete penetration welds should be used to avoid pinhole formulation in the weld bead which can trap moisture under the coating system and cause extensive internal corrosion. B) Apply primer within 6 hours after sandblasting of steel to minimize surface rust (rose) formation if **Prep Step Gel Concentrate** is NOT USED. C) **SP-3 Power Tool Cleaning** can be used in conjunction with Prep Step Gel Concentrate for rust removal but is not recommended for mill scale removal.

2) **Surface must be clean** of all sand blast dust, dirt, oil, slag and mill scale prior to application of the primer. Use Degreaser to remove oil or grease contamination followed by a power wash. For areas that cannot be sandblasted or areas that have been aged after original sandblast, apply **Prep Step Concentrate** (full strength) to rusted areas, wire brush (wire wheel or other mechanical means) & scrape and flush grime from area with **Prep Step Concentrate** diluted 1 part to 8 parts water. Blow off dust and debris with dry compressed air (air dew point of 0 degrees F or less and oil free).

3) **Apply Zero-Rust® Black or Red Oxide primer** at 5-6 mils wet (2.5-3.0 mils DFT) over blast profile or 5-6 mils wet (2.5-3.0 mils DFT) over flat steel with airless spray equipment, brush or roll. **Strip coat all edges by brush** to ensure proper millage on edges following full coat application. When covering blast profile or rough surfaces, we recommend to spray two light coats with 1-2 hour cure (at 70 degrees F and 50 % relative humidity) between coats rather than 1 heavy coat for faster dry and cure. Brush or roll procedure will require 2-3 coats to achieve proper millage. Agitate coating to ensure proper mixing. Allow 1-2 hour dry before recoat with primer by spray and 4-6 hours when using brush or roll. Must recoat within 5 days for proper adhesion and bonding. Use wet mil gauge to check thickness during application. Use Xylol or **Zero-Rust Thinner** for thinning and clean-up. Normal product usage: 250-300 sq ft/ gallon with high product transfer efficiency over flat surface -- 200-250 over 1-1/12 mil blast profile; less in windy conditions with spray or if small diameter pieces are being coated (possibly 20-50% of normal coverage for 3" and 4" pieces). **For marine and other corrosive environments, we recommend 2-3 airless spray coats to achieve 4-6 mils DFT.**

Note: **It is always best to remove all old coatings before applying Zero-Rust® for maximum adhesion**. However, **if Zero-Rust® is applied over other primers or coatings, always sand the cured coatings with 150-220 grit sandpaper to facilitate adhesion**. Wipe or power wash sanding residue before coating. Do not use oily rags or recycled solvent in removal process.

4) **Apply SA-3 Gloss Silicone Alkyd Enamel as topcoat** at 5-6 mils wet (2.5-3 mils DFT). SA-3 can normally be applied in single coat by airless spray (if thinned, 2-3 coats); 2-3 coats necessary to achieve millage by brush or roll . **Strip coat all edges** to account for edge creep upon drying. For brush and roll, use mineral spirits for thinning. Use wet mil gauge to measure thickness during application. For conventional or airless spray, use Xylol,

VMP Naphtha or **Zero-Rust Thinner** (VOC Compliant) for thinning & clean-up. Set time is normally 2-3 hours. Recoat time 48-72 hours. Dries hard in 24 hours @ 2.0 mils dry film thickness. Normal product usage: 250-300 sq ft/gallon at 100% product transfer efficiency (for brush or roll); less in windy conditions with spray. Use frequent agitation during application.

Note: Zero-Rust® has a critical "recoat window" as it becomes very hard and impervious as it ages. Zero-Rust must be topcoated within 2 days when using waterborne or light solvent topcoats (light solvents include paint thinner, OMS or turpentine); within 5 days for strong solvent system coatings (MEK, Xylene, etc.). When topcoating Zero-Rust after these time windows, scuff sand surface to roughen surface for proper adhesion. When in doubt, always scuff sand. The time windows will be affected by increasing or decreasing temperatures and humidity.

5) If **bolts and nuts are not sand blasted; apply Prep Step Concentrate®** followed by wire brush for rust removal of entire surface and threads. If grease and oil present, solvent wipe or solvent soak (best) to remove oils or grease before applying **Prep Step**. Blow off dust and debris prior to application. Brush works good for thread applications of **Zero-Rust**. Bolts should be primed with Zero-Rust prior to installation if possible. Apply **SA-3** topcoat to threads & nuts after installation (thread and head touch-up with **Zero-Rust** may be necessary prior to **SA-3** application). Same millages as in Item 4}.

NOTES:

1) **When doing spaghetti steel** (1/2"-4" diameter piping or structural pieces), recognize that application rate may drop to 100-200 sq ft/gallon because of low transfer efficiency for both **Zero-Rust** primer and **SA-3** topcoat. Use of HVLP helps spray efficiency.

2) **Read all product data sheets before application.**

3) **Materials can be tinted with industrial or universal tint system** depending upon the system. **Recognize product and gloss life are reduced somewhat when industrial or universal tints are used** -- especially deep, safety and bright colors. Industrial tints are the better choice.

4) **Special primer formulations exist for quicker dry time and/or lower VOC** (as low as 275 g/liter) for volume users. Lower VOC formulations are also available for volume SA-3 users.

5) **VOC compliant solvents** for clean-up and thinning are available from FSC.

6) **Strip coat all edges** before applying full field coat to account for coating shrinkage or creep during the drying process.

7) If **Zero-Rust® is applied over mill scale or other contamination, adhesion loss can occur.** Removal of all contamination including flake or powder rust is recommended.

8) For **galvanized surfaces**, follow our specification for **coating previously uncoated galvanized steel**. Zero-Rust® must be modified for use on galvanize surfaces & special surface treatment such as GalvaPrep is involved.

9) **Zero-Rust can be topcoated with other high performance water-borne** (**Maxlife & Graffiti No More** Ultra Performance Acrylics) and **solvent-borne systems** (alkyd enamels, two component urethanes and epoxies) to achieve other properties or improve chemical resistance. Please contact FSC for special procedures. Recoat windows vary for these systems. (zrnewappl.doc--Dec 1999)

Orders & Technical Info: FSC Coatings (858) 558-0800 or (800) 579-8459

Manufactured By: Amteco, Inc.

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FSC Coatings -- 5360 Eastgate Mall Rd. Suite F, San Diego, Ca. 92121 -- 858-558-0800 -- Fax: 858-558-2159

FSC COATINGS – Coatings Engineered For Ultimate Performance
Phone: (858) 558-0800 or (800) 579-8459 **Fax: (858) 558-2159**

PRODUCT DATA SHEET

SA-3 SILICONE POLY PLUS™

SILICONE COPOLYMER ENAMEL (VOC COMPLIANT)

PRODUCT DESCRIPTION

The highest performance single component, silicone copolymer enamel available today based on independent testing. **SA-3 Silicone Poly Plus™** is a high solids gloss topcoat which meets or exceeds the performance standards of Federal spec. TTE-490E @ MIL E 24635A Type 1 @ 2. The **Silicone Poly Plus™** exhibits outstanding gloss and color retention, equal to or greater than many high solids, two component industrial urethanes. For a one component high solids finish with exceptional application properties, this is an extremely user friendly product for maintenance and architectural applications where long term performance is essential. Adhesion is excellent over a broad spectrum of previously painted surfaces including Kynar™ and Duranar baked coatings. Cured finish has superior adhesion as well as excellent direct and reverse impact resistance for direct to steel applications. Test results show that **SA-3 Silicone Poly Plus™** has greater reverse and direct impact strengths than common industrial urethanes. **SA-3** is also available as MIL E 24635A Type 3 where a 2.3 lbs./gal. VOC may be required.

PRODUCT USES

Tanks, pressure vessels, well heads, truck bodies & frames, piping, hand rails, metal siding, railcars, transmission towers, implements, above water marine structural components, ships, barges, trailers, pumps, pallet racks, water treatment equipment and a variety of maintenance applications. For extended chemical resistance properties, the finish may be catalyzed with U-13 Aliphatic Urethane Prepolymer Catalyst. Product may be applied direct to clean metal for mild corrosive conditions for inside and exterior applications.

PHYSICAL PROPERTIES

WEIGHT PER GAL:	9.87 lbs.	VISCOSITY:	78-82 K.U.
FLASH POINT:	T.C.C. 104 P.	VOC:	351-410 gm/l.
WEIGHTS SOLIDS:	71% +-2	VOLUME SOLIDS:	56% +-2
60 DEG. GLOSS:	90+	DRY TIME @77°F:	S.T.- 2-3hrs.
DRY HARD:	24 HRS. @ 2.0 DFT.	DRY TO RECOAT:	48-72 HRS.

QUV Accelerated Weathering: >75-80% Gloss retention @ 500 hrs

APPLICATION & THINNING

Conventional, HVLP or airless spray. Brush, applicator pad or roll. Excellent appearance even when applied by brush and pad. Thin with ZR Thinner or appropriate FSC reducer.

SPREAD RATE

@400 ft²/gal	4 mils wet film = 2.0 mils dry film
@280-320 ft²/gal airless spray	5 mils wet film = 2.5 mils dry film

GLOSS

Standard is a mirror finish of 90-95 gloss; semi-gloss & satin sheens available in large batches at additional cost.

SURFACE

PREVIOUSLY PAINTED: Remove dirt, grease or surface chalk. Scuff sand with maroon Scotch-Brite pad and remove residue. Use Prep Step® to assist with loose rust removal. Prime rust spots with *Red* or *Black* phenolic alkyd "ZERO RUST"® primer. See FSC procedure for complete application procedure.

UNPAINTED NON-FERROUS METAL and METAL SURFACES: Check with your FSC Coatings technical sales representative regarding proper metal preparation and primer selection.

LABORATORY TEST RESULTS

The following data is a direct comparison of the old standard TTE - 490, 30% silicone/alkyd copolymer with our new silicone copolymer technology. The new resin allows for formulating to low level VOC's with good application properties and outstanding physical properties. All data is based on 1.5mm dry film thickness on B-1000 CRS after one week air dry.

		TTE-490 Navy Haze Gray	SA-3 Navy Haze Gray	SA-3 White
DRY TIME	:Set to Touch	1.25 hrs.	1.5 hrs.	1.5 hrs.
	: Tack Free	3.0 "	6.5 "	6.5 "
	: Hard Dry	4.0 "	6.5 "	6.5 "
	: Through Dry	4.0 "	6.5 "	6.5 "
HARDNESS	:Sward 24 hrs.	10	6	8
	:One Week.	24	14	18

QUV: Accelerated Weather UVB313/8 hrs. @ 60°C., followed by 4 hrs. of condensation at 40°C., 2 cycles/ 24hrs.

Initial	60° Gloss:	93	93	89
	336 hrs.:	79/85%	82/88%	78/88%
	672 hrs.:	61/66%	61/66%	52/58%
	1008 hrs.:	35/38%	33/36%	34/38%

CLEVELAND HUMIDITY: Continous condensation at 100°F.

Initial	60° Gloss:	93	93	89
	1008 hours.:	86	86	81

SALT SPRAY: ASTM B-117. @ 168 HRS.

Field	none	none	none
Scribe blisters	dense #2	few #4	very few #4
Scibe creepage	1/4"	1/8"	1/32"

DRY FILM PROPERTIES:

Hardness:	<2B	<2B	<2B
Direct impact "/lbs.:	130 OK	160 OK	150 OK
Reverse " " :	50 OK	150 OK	135 OK
1/8" conical bend	pass	pass	pass
X-hatch adhesion:	5B	5B	5B

TEST RESULTS SUMMARY: In most cases the **SA-3 Silicone Polyester Plus™** properties exceed those of the original TTE 490E formulations and newer Navy topcoat systems. Other than slightly slower dry characteristics, the cured films have superior direct to steel adhesion and moisture resistance under salt spray conditions with improved impact resistance. The impact strengths are greater than most industrial urethanes—specifically the reverse impact strength which is the best indicator of long term adhesion is up to 100% greater with **Silicone Poly Plus™.**

Technical Support and Distribution: FSC Coatings (800) 579-8459 or (858) 558-0800
Manufactured By: Amteco, Inc.

Ameron®

Amershield™

Aliphatic polyurethane

Product Data

- Unique, high-solids, high-build, multifunctional coating
- VOC Compliant
- High-gloss, self-priming coating
- Excellent gloss retention
- Direct to metal and concrete
- Outstanding abrasion, reverse and direct impact resistance
- Good chemical and stain resistance
- Tough and flexible coating

Amershield displays high gloss; shows excellent color and gloss retention during extended service periods. The direct-to-metal capabilities of Amershield provide a single-coat system at reduced installation cost. Compatible over prepared, smooth cold-rolled steel and abrasive blasted hot-rolled steel.

Amershield has excellent adhesion to concrete providing a durable, glossy, easy-to-clean flooring system. May be used over Amerlock® as a durable, weather-resistant topcoat for extra heavy duty service; over zinc-rich epoxy coatings as a direct topcoat; over intact, old paint as a maintenance product.

Standard Amershield's drying and curing time may be adjusted with Amercoat 865 Accelerator for convenient application. A full color range is available in the Ameron Rapid Response color system to provide timely delivery.

Typical Uses

- •Structural steel
  - Bridges — Marine
- •Tanks
- •Piping
- •Industrial plants
  - Power — Wastewater treatment
  - Pulp and paper — Chemical and petrochemical
  - Food and beverage
- •Concrete walls and floors
- •Transportation
  - Rail car exterior and hopper lining
  - Vehicle equipment - buses, trucks, lifts
- •Marine
  - Decks — Topside and superstructures on ships
  - Boottops — Barges and offshore platforms

Typical Properties

Physical

Impact resistance (ASTM D2794) @ 5 mils				
direct	140 in	lbs	15.8 N	m
reverse	50 in	lbs	5.6 N	m
Taber abrasion				
1 kg load/1000 cycles	weight loss			
CS-17 wheel	60.2 mg			
Elongation (ASTM D522)	>32%			
Graffiti cleaning with Amerase with gloss retention	100 cycles			

Physical Data

Finish	Gloss
Color	See Ameron color chart
Components	2
Curing mechanism	Solvent release and chemical reaction

Volume solids (ASTM D2697 modified) 73% ± 3%

Dry film thickness per coat	5 mils (125 microns)
Coats	1

Theoretical coverage	ft²/gal	m²/L
1 mil (25 microns)	1171	29
5 mils (125 microns)	234	5.7
VOC	lb/gal	g/l.
mixed	2.2	264
mixed/thinned (1 pt/gal)	2.7	323
Temperature resistance (dry)	°F	°C
continuous	200	93
intermittent	250	121
Flash point (SETA)	°F	°C
cure	122	50
resin	110	43
mixed	115	46
Amercoat 65	78	25
Amercoat 12	0	-18

Qualifications

USDA – Incidental food contact
Tint and custom colors

NFPA – Class A

Application Data

Applied over	Prepared steel, aluminum, galvanizing, masonry and primed concrete
Surface preparation	
steel	SSPC-SP1, 6 or 10
aluminum	Alodine®, Alumiprep® or light abrasive blast
galvanizing	Galvaprep® or light abrasive blast
concrete	See specific primer
masonry	ASTM D4261
primed surface	See specific primer
previously coated surface	SSPC-SP1, 3 or 7

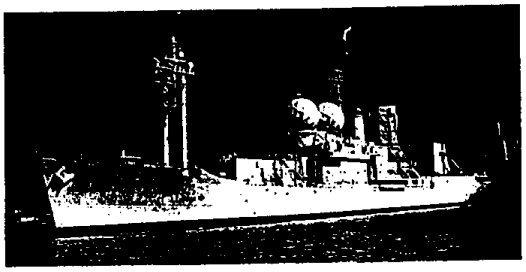
Appearance will vary depending on substrate and application method

Mixing ratio (by volume) 1 part cure to 4 parts resin

Pot life (hours)	°F/°C		
	90/32	70/21	50/10
Amershield	1½	2½	5
accelerated with 865	¾	1½	3

Using ½ pt Amercoat 865 per mixed 5 gallon Amershield

FACTOR 1



Unsurpassed performance

PSX 700 offers a longer service life than the traditional epoxy/aliphatic polyurethane system it replaces (see Figure 1, Service Life Projections). But when combined with an inorganic zinc primer (such as Ameron's Dimetcote 21-5 or 21-9), the 2-coat system significantly outlasts the best 3-coat zinc silicate, epoxy, polyurethane system. Here are just a few of the performance benefits offered by PSX 700:

- Gloss and color retention surpasses that offered by an aliphatic polyurethane (see Figure 2).
- Corrosion and chemical resistances exceed those provided by an epoxy coating.
- Adhesive strength of 2700 psi (on steel, using ASTM D4541) is more than double the 500-1000 psi offered by conventional epoxy coatings.
- Abrasion resistance is greater than or equal to a flexible aliphatic polyurethane and far superior to an ordinary epoxy (see table on back page).
- PSX 700 is highly resistant to stains, graffiti and dirt accumulation.

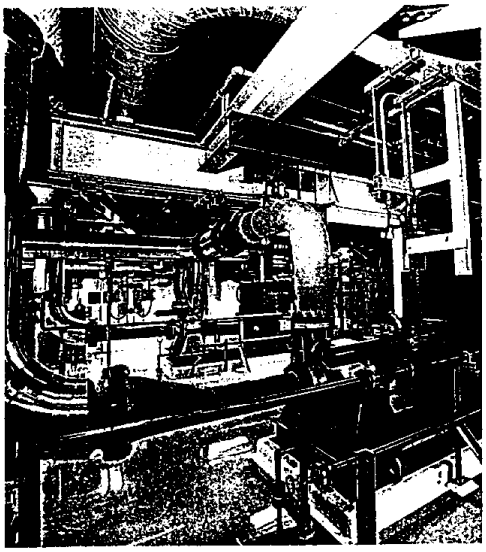


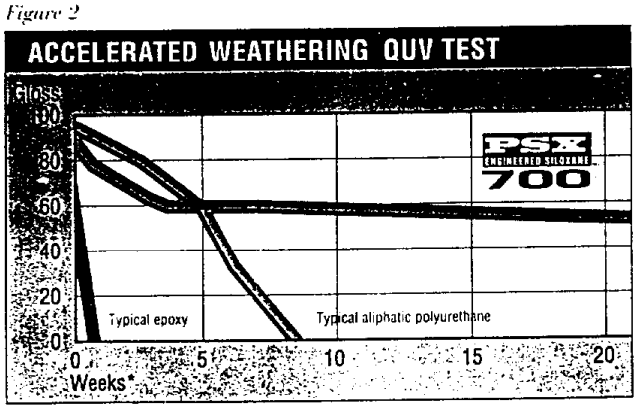
Figure 1

SERVICE LIFE PROJECTIONS

System	Number of Coats	Years of Service† SP-2/3	Years of Service† SP-5	Conditions*
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* *Moderate = General industrial, no heavy fumes or fallout, 3 mils/year corrosion of steel.*
Severe = Heavy industrial, heavy fumes and fallout, 3-6 mils/year corrosion of steel.
***Assumes, conservatively, a 30% improvement in performance.*
† *Reference NACE Paper #335.*

Figure 2



* *1 week approximates 1 year of Florida exposure.*

FSC COATINGS
(858) 558-0800 or (800) 579-8459

Product Data Sheet

AWR 2 & AWR 3 "Super Sealers"

Acrylic Lacquers in Satin or Gloss

Sealers for Concrete, Masonry & Aggregate Surfaces

Product Description—Voc Compliant

AWR 2 & AWR 3 Series materials are water clear 100% Acrylic solution surface lacquer sealers for exterior and interior use on concrete, masonry and aggregate surfaces. The resin has superior ultraviolet light resistance and does not yellow on exterior exposures. AWR is specifically designed for ease of maintenance due to its' ability to re-dissolve into itself when recoating after aging. The film has superior resistance to traffic and most water & solvent borne common chemicals. Properly sealed surfaces have excellent food stain resistance. AWR can be tinted with solvent tints and is available in satin, gloss, grey, black (for asphalt) and custom colors.

The AWR Super Sealer family repeatedly has been shown to be the highest performer of all the competitors in comparative testing. This testing includes uses for amusement parks (San Francisco's Pier 39), public roadways and regional shopping centers.

Product Uses

Decorative & uncolored concrete aggregate finishes, terracotta tile, interlocking pavers, concrete, block, interior & exterior concrete floors, brick, driveways, precast exterior aggregate construction panels, stone, stucco, asphalt and patio blocks.

Typical Projects

Driveways (asphalt & concrete), sidewalks, amusement parks, restaurant floors, hotel entries, parking garages, warehouse floors, loading docks, water treatment facilities, roadways (Highway 111 in Palm Springs), pool decks, stamped concrete surfaces and acid stained concrete surfaces.

Technical Data & Physical Properties	AWR 2-SAL	AWR 3-SAL
Weight per Gallon	10.5 -11.5 lbs.	11-13 lbs/gal
Flash Point	110°F	90-110°F
Non-Volatile Solids (VOL)	13-14.3%	18-20%
VOC (340 gm/l available on special order)	400-550 gm/ltr	400-550 gm/ltr
Solvent for Thinning & Clean-Up (VOC Compliant)	ZR Thinner	ZR Thinner

Technical Data		AWR 2-SAL	AWR3
Re-coat Time		2 to 4 hours	2 - 4 Hrs.
Dry Time	@ 77° F	30 Min.	30 Min.
Dry Hard	@ 77° F	1 - 2 Hrs.	1 - 2 Hrs.
Re-coat	@ 77° F	2 Hrs.	2 Hrs.

Clear and Colors

AWR Series Sealers in "satin" or "gloss" sheens are available in clear, grey and black. Special colors can be made for a nominal upcharge.

Surface Preparation

Remove dust, grease and oily deposits. New concrete surfaces should be aged 60 days minimum. Exterior concrete surfaces (particulary new) which are steel trowel finished, must be mechanically (example - blast track) or acid etched (acid must be neutrilized) to insure proper penetration & adhesion. The surface must be thoroughly rinsed (power wash is best) after etching & neutralizing to remove excess salts and debris.

Surface must be thoroughly dry for 36 hours. If moisture remains, white spots and/or disbonding may occur due to activation of the water repellant. White spots may normally be removed with an AWR Thinner application which redissolves the resin in preparation of another light AWR coat (sometimes 2 or 3 solvent treatments required). If white spots occur in heavy AWR build-up, sand off build-up down to substrate and reapply AWR. To be effective and prevent peel, AWR must penetrate into the masonry, concrete or asphalt matrix. Hard water deposits from landscaping water or regular hosings can leave a white film on surface.

Application

AWR Series Sealers are two coat systems. Best to spray or roll apply in thin surface wetting coats. The first coat is intended to penetrate deeply and should almost disappear into the substrate. Allow first coat to dry 2 to 4 hours. The second coat will re-dissolve the first coat and drive it deeper into the substrate. Do Not Leave Puddles On Horizontal Surfaces!!! A uniform light sheen should result after the second coat. A third coat may be required or desired if the surface is very porous (such as flat block, split face block or sandblasted surfaces). The porosity and temperature of the surface/substrate influence the amount of sheen and resulting surface wear characteristics. Porosity determines the amount of product required for each coat.

Equipment Application

AWR Series Sealers may be applied by spray, roller or brush.

1. **Roller:Use 3/8" Pronell nap or standard 1/4" nap roller. Work out of a paint tray or pour AWR directly on to work area. Only work each area with a couple strokes--PENETRATION IS QUICK WITH FAST DRY! Curing on the roller means the area is being over worked. Work roller in front of the body, not side to side.**
2. **With AWR 2 -SAL, use spray application when surface temperature is above 90 °F.**
3. **Spray equipment must be compatible with Perchlorethylene, Acetone & Oxol 100 (Viton/Teflon & stainless steel parts).**
4. **Spray Applications: Use standard airless or HPLV equipment with a 50% overlapping stroke. Slight sheen will show after application. Uniformity of sheen will depend on the uniformity of porosity and application technique. Recommended spray tip and pressure: 0.017 - 0.019 (6501 - 6502) tip orifice @ 900 - 1200 psi.**

Precautions:

1) **Wear respirators when applying these materials. Do not smoke in area or apply near open flame due to flammability & hazardous combustion gases.**

2) ALWAYS APPLY AWR SUPER SEALERS TO TEST AREA BEFORE PROCEEDING WITH FULL APPLICATION. If AWR is applied in a heavy single coat, peeling, disbonding and premature wear patterns may result due to excessive surface build up. Do not apply to previously sealed surfaces other than AWR previously sealed surfaces, unless a test area is done before proceeding with AWR application.

3) AWR SUPER SEALER Is Not a waterproofing system. Water migration through stone or masonry surface can result in disbonding and efflorescence.

Spread Rate

New Smooth Concrete Floors	200-300 ft² / gal
Old or More Porous Surfaces	150-200 ft² / gal
Stucco	100-150 ft² / gal
Very Porous Decking & Vertical Surfaces	100-150 ft² / gal
Concrete Pavers & Unsealed Block	80-100 ft² / gal
Split Face Block	60-80 ft² / gal
Polygrit Anti-slip Applications	50-100 ft² / gal

"Water Resistance Testing" is recommended. After 24 hours of cure, flood AWR Coated surface with water to ensure water seal. Mark dark areas (where water has penetrated). After 24-48 hours dry, apply AWR to marked areas and repeat test to ensure water seal.

Notes

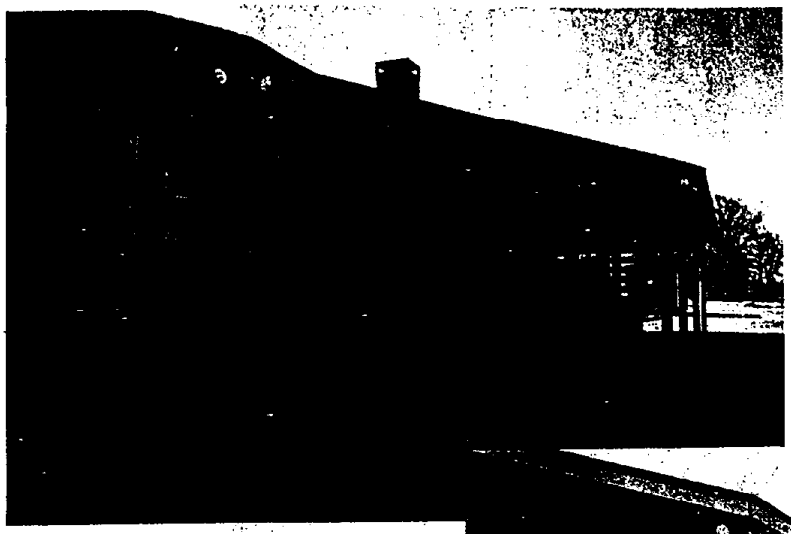
1. Though not a problem to date, it is possible that "hot" tire marks could be left in material in applications where vehicular traffic is present.
2. Tinted materials will require more frequent maintenance coats than clears
3. Allow test samples to age for 1 month for full evaluation
4. Where maximum traction is desired, incorporate "POLY-GRIT"™ non-slip additive @ 5-7 oz. by volume of "POLY-GRIT"™ per gallon of AWR. Mix "POLY-GRIT"™ into AWR and stir. Apply mix with roller. Apply 2-3 topcoats of AWR over base coat to hold the "POLY-GRIT"™. Yearly and bi-yearly maintenance is required on such applications.
5. Will not stop water migration or efflorescence from underneath the surface.
6. Negative side water and edge water migration (as from landscaping sprinklers) can cause white spots and/or lifting & peeling of AWR.
7. Consider PRIME & SEAL™ and SILOX SEAL™ for sidewall sealing applications because of their superior vapor transmission rates and "breathability".

Thinning & Cleanup

Thinning not required except during high temperatures. Thin with 1 qt. ZR Thinner (VOC Compliant) per gallon when surface temp exceeds 95 °F. Use ZR Thinner to clean equipment.

Manufactured By: Amteco, Inc.

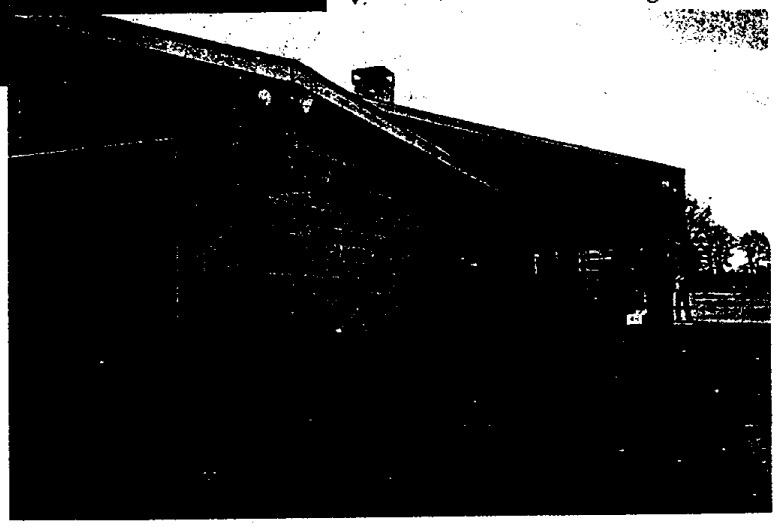
Technical Information & Sales: Fiber Saver Coatings, Inc.
(858) 558-0800 or (800) 579-8459



← **BEFORE.** Badly weathered logs and siding show graying and mildew prior to cleaning. A heavy pigmented finish would be required for covering, creating a painted look.

These two photographs courtesy of Weatherguard Systems, Inc., Marshall, Texas.

AFTER. Once cleaned, logs and siding have a light, uniform color, ideal for finishing. ↓



Weathered, mildewed log homes can be cleaned and refinished to achieve a new look.

Beat the Weathering Problem

People who build or buy log homes obviously like the beauty of natural wood. Unfortunately, all natural wood exposed to sunlight and rain quickly weathers, turning gray. Mildew can also discolor wood, adding a blotchy-black to complete black discoloration. For example, unprotected log homes exposed to our East Texas climate often turn black within 10 months. Thus, most log home owners soon find they have a constant "battle on their hands" to keep their logs and other exterior wood looking natural and beautiful.

A recent study shows that almost 80 percent of homeowners prefer a natural to a weathered wood look. Log home owners who are aware that unfinished logs, wood siding, and trim turn gray apply stains, water repellents, varnishes, urethanes, clear finishes, linseed oil or various combinations of these for protection. They quickly discover that some don't control graying at all, others provide protection for just a few months, and most provide little or no mildew control.

By CHARLES L. STAYTON
Extension Wood Products Specialist
Texas A&M University System

Log homeowners not aware that wood weathers and mildews are quickly educated and soon resort to applying a pigmented finish, trying to regain the natural look. But, the gray, mildewed wood requires a heavy pigment to achieve a uniform appearance. The result is wood that looks painted. To achieve a new log home look requires that you clean the weathered, mildewed logs and other exterior wood first. This provides a clean, uniform wood surface for the new finish application.

Cleaning Weathered Logs

Weathered log homes are defined by their gray color or may be partially or totally black due to mildew. Cleaning provides a uniform light color which, when finished, gives your log home a new natural look. Cleaning is achieved by applying a chlorine solution or power water washing.

Chlorine solutions can be made either by mixing one part liquid laundry bleach (5 percent sodium hypochlorite) to an equal part water or mixing two ounces of granular, 65 percent calcium hypochlorite (used for swimming pools) to one gallon of water. You can apply the chlorine solution using an all-plastic garden pump sprayer or rent a commercial sprayer. (Chlorine solutions are corrosive and should not be applied with commercial sprayers unless internal parts are designed for such chemicals.) You should wear protective clothing, rubber gloves and eye protective glasses while spraying. (It is best to wear an approved respirator face mask, particularly if a commercial sprayer is used or there is a strong wind drift.)

The applied chlorine solution should be left on the wood 15 to 30 minutes and then rinsed thoroughly using a garden hose with a pressure nozzle. Adequate rinsing is achieved when only

slight foaming occurs. Plants, flowers and grass can be protected by wetting them thoroughly with water prior to and after applying the chlorine solution.

If the logs or other exterior wood have algae, moss or lichen growth, it will usually require power water washing to remove them. If so, it may be best to clean the entire wood structure using a power washer. The pressure used depends on the degree of weathering and algae, moss and lichen growth. Usually, around 700 to 1000 p.s.i. will work, but some power washers have over 2000 p.s.i. capacity. You must be careful not to exceed the wood strength, causing splitting or breakage. It is best to start at a lower p.s.i. and slowly increase to the needed pressure. If the pressure is not adjustable, then the control is by the distance the spray wand is held from the wood. Power washers can usually be rented locally at rental supply companies for around $50 to $90 per day.

The cleaning process shows immediate results. The weathered, mildewed wood will be restored to almost the original color. This color is the final stage with power washing, but chlorine solutions bleach the wood to a uniform white color. Either process creates a clean, uniformly colored suface ideal for finishing.

Stains on wood siding and trim, caused by rusting nails, will not be removed by bleaching or power water washing. This unsightly problem could have been eliminated if hot-dipped galvanized, stainless steel or aluminum nails had been used. These stains can be removed using oxalic acid, but will reappear with continued nail rusting.

Finishing After Cleaning*

Cleaned logs and other exterior siding and trim must be finished. Otherwise, the weathering process will once again turn the wood gray. You should allow the cleaned logs and other exterior wood to completely dry before applying a finish.

Finishes that provide an attractive, mildew free appearance for more than two years are limited. Weathering tests conducted by the Texas Forest Services' Forest Products Laboratory show that most natural wood stains and water repellents last only 7 to 18 months before mildew and weathering begin. These test results tell us that the new finish you apply must be pigmented to keep the wood looking natural. The pigment must be high quality so that it compliments rather than masks the wood. The finish must contain preservatives to control decay and mildew fungi. A wood penetrating water repellent and ultraviolet light absorber will help the finish to maintain a good appearance. The finish should penetrate into the wood rather than form a surface film. (Surface films will eventually crack and peel, requiring scraping and sanding before refinishing. Such refinished surfaces never look natural.) An outdoor finish should not contain a high linseed oil content because it can become a mildew problem.

Only three finishes tested in Texas offer the log home owner a natural look for 2 to 5 years before refinishing is necessary.

TWP, a total wood preservative, has shown excellent results on wood siding test samples and accelerated tests on spruce logs. It contains both a fungicide and mildewcide, as well as a pigment, resin, ultraviolet light absorber and water repellent. TWP is ready-mixed and available in cedartone, redwood, dark oak, walnut and barnwood colors. It provides maximum mildew control and keeps wood looking very natural for 3 to 5 years. Refinishing is necessary when mildew appears or pigment breakdown starts.

TWP can be brushed or sprayed and should be applied to saturation (until it begins to run). For logs, it is best to apply one coat, let dry and flood surface with water. Locate and caulk any leaks through logs, allow to dry, and then apply a second coat of TWP. For wood siding and trim, one coat of TWP is sufficient.

Cunapsol 5, a water soluble copper napthenate concentrate diluted 1:4 with water, can be used to finish log homes. We have tested it on regular wood siding and shingle roof weathering samples and applied it to two cedar siding homes and several fences as result demonstrations. It imparts an initial green color which weathers to a cedar brown. It is best to pigment the ready-to-apply solution with brown

(please turn to p. 51)

**Finishing information recommendations are based on tests and result demonstrations performed primarily in East Texas. The opinions given should in no way be interpreted as an official endorsement by the Texas Agricultural Extension Service or the Texas Forest Service, both of the Texas A&M University System.*

TWP (1:1 blend of cedartone and dark oak colors) gives logs and trim a natural look while providing excellent weathering and mildew protection.

Cunapsol 5, diluted 1:4 with water and pigmented with brown iron oxide, lightens to a cedar brown color and provides good protection.

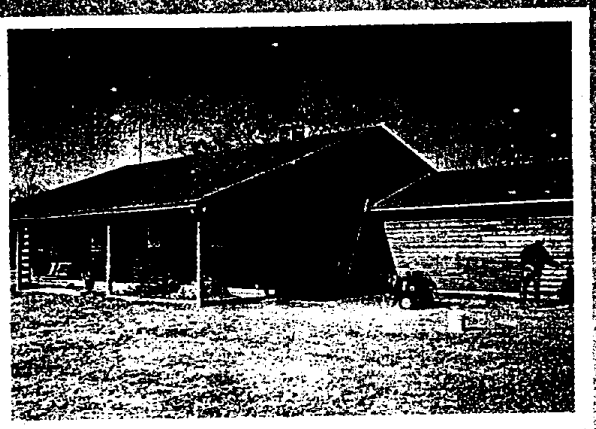
Sikkens, a multi-coat system, gives a natural look, but forms a surface film subject to cracking when fully exposed after 2 to 3 years. *(Editor's note: No log surface should be fully exposed. Logs should always be protected from the weather.)*

Log Home Construction & Maintenance

(CCA pressure-treated logs can be finished after they have weathered for 6 months in an exposed location or 1 year in a protected location such as under a covered porch.)

The finish should protect against weathering (sunlight and rain), decay and mildew. (CCA treatment protects logs from decay, but not mildew.) The finish also must contain a pigment if the homeowner wishes to maintain the original wood color or mask the greenish color of CCA treatment.

Weathering tests conducted by the Texas Forest Service's Forest Products Laboratory show that most wood stains, water repellents and preservatives last only 7 to 18 months before mildew or weathering begins. Most log home owners report that they are refinishing annually to maintain the original wood color.



Continual maintenance is essential in order to prevent problems caused by weathering, mildew and wood decay.

One product tested in Texas and Missouri has proved effective in controlling both weathering and mildew. It is TWP (Total Wood Preservative). TWP contains both a fungicide and a mildewcide, as well as a pigment, resin, ultraviolet light absorber and water repellent. The TWP finish lasts about 5 years and may be the best way of maintaining an attractive, natural wood look.

Seal Treat II is another product which gives a long-lasting finish. However, it is only available in a clear, ready-to-use solution and is not effective in maintaining the original color of wood. Wood treated with Seal Treat II weathers to a pleasing ash-white color. This product controls mildew well.

Sikkens, a product which must be applied in multiple coats, has shown acceptable results for shorter periods of time. It tends to break down under ultraviolet light within 2 to 3 years, and does not protect against mildew for very long in hot, humid climates. Although the initial cost of Sikkens is high when compared to other products, its coverage rate tends to compensate for the cost difference.

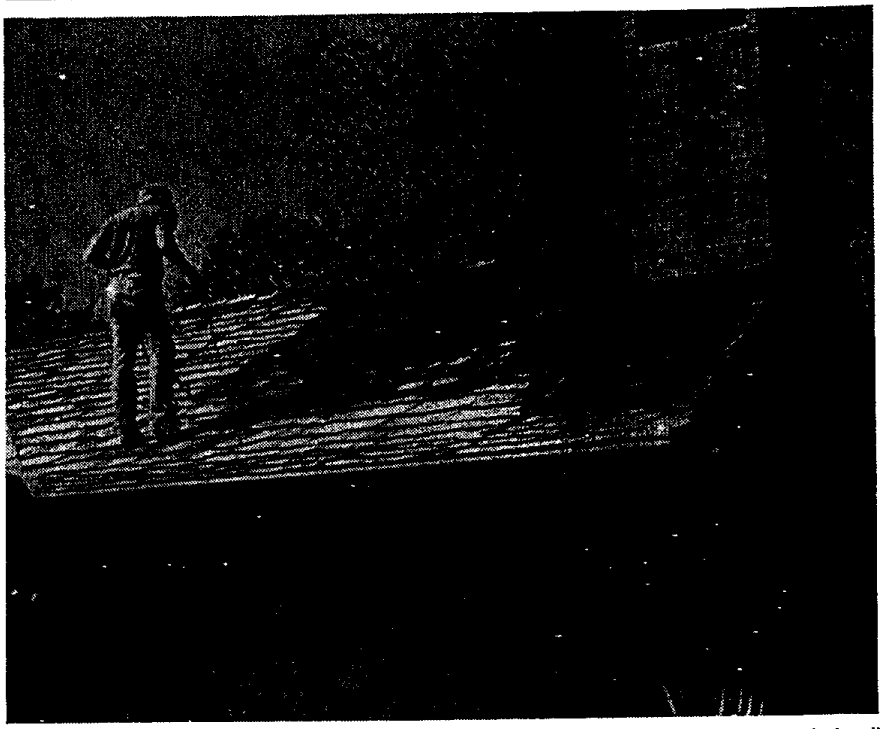
Controlling Decay and Insects in Existing Log Homes

Owners of log homes often experience wood decay and insect problems. The most common insect problems are caused by beetles which attack the wood within days after trees are felled or as logs are dried, machined or transported. These beetles include: the metallic wood-boring beetles sometimes referred to as flatheaded borers; long-horned wood-boring beetles or roundheaded borers; ambrosia beetles and pin-hole borers; and powderpost beetles and old house borers.

The beetle larvae most often found in homes constructed of softwood logs are metallic wood-boring beetles. The adults lay eggs in bark cracks and crevices of unseasoned logs. The larvae feed deeper into logs as the wood gets drier, and emerge as adults within 1 to 5 years after house construction. The 1/4-inch to 3/8-inch oval holes they leave upon emerging can trap water in the insect tunnels, causing decay. These emergence holes should be sealed with polyurethane caulking. No treatment for these beetles is required.

Powderpost beetles and old house borers infest wood after debarking and during seasoning, storage, transit or construction. The adults emerge 3 or more years later and can then reinfest the wood. Therefore, emerging beetles must be identified so that appropriate control methods can be used. These methods include spraying or injecting the logs with an EPA-registered insecticide or, in certain cases, fumigating logs under a gas-tight tarpaulin. Both of these control methods will require the services of a certified pest control operator.

Subterranean termites can pose a serious threat to log homes; that is why homeowners are strongly advised to have the soil properly treated prior to or during construction. If termites attack logs after the home is built, the damage can result in substantial labor and repair costs. Also, it is much more expensive and difficult to treat the



After power washing and repairing this red-cedar roof, a worker applies a wood preservative, which will keep it free of mold, lichen, and decay for up to five years.

RESTORING *and* TREATING WOOD SHAKES *and* SHINGLES

Double or triple the service life of a cedar-shingle roof by power washing and treating

by Brian Buchanan

Dating back to the earliest days of colonization in North America, cedar shakes and shingles have offered strength, durability, insulation, and beauty to our homes. A wood roof imparts a look of quality that few other roof coverings can match.

Only a few years of exposure to the weather, however, can drastically change this "quality" roofing. Through the interaction of sunlight and rainfall, cedar shakes and shingles can lose virtually all their natural preservatives in as short a time as five years. At this age, most cedar roofs begin to show signs of cupping, curling, splitting, and decay.

Unlike most roofing materials, however, cedar shingles and shakes can be restored and maintained through proper care and treatment, often doubling or tripling the remaining service life.

Why Wood Roofs Weather

Western red cedar is an extremely durable material even under adverse conditions, but its useful life depends upon the environment. Cedar roofs left unprotected suffer photodegradation by ultraviolet light (sunlight), leaching, hydrolysis, shrinking and swelling by water, and discoloration and degradation by decay microorganisms.

Photodegradation by sunlight. Solar radiation is the most damaging component of the outdoor environment. Photodegradation due to sunlight occurs fairly rapidly on the exposed shingle surface. The initial color change from the golden, orange-brown color to gray is related to the decomposition of lignin in the surface wood cells. (Lignin is Mother Nature's way of holding wood cells together.) The wood cells at the shingle surface lose their strength and eventually are washed away by rainwater. In addition, microscopic cracks and checks develop, allowing deeper water penetration.

Degradation by moisture. Accompanying this loss of wood fiber at the shingle surface are the shrinking and swelling stresses set up by fluctuations in moisture content. These stresses cause deeper checks and splits to develop. The result: shakes and shingles begin to cup, curl, split, and check at an accelerated rate.

Degradation by wood-destroying

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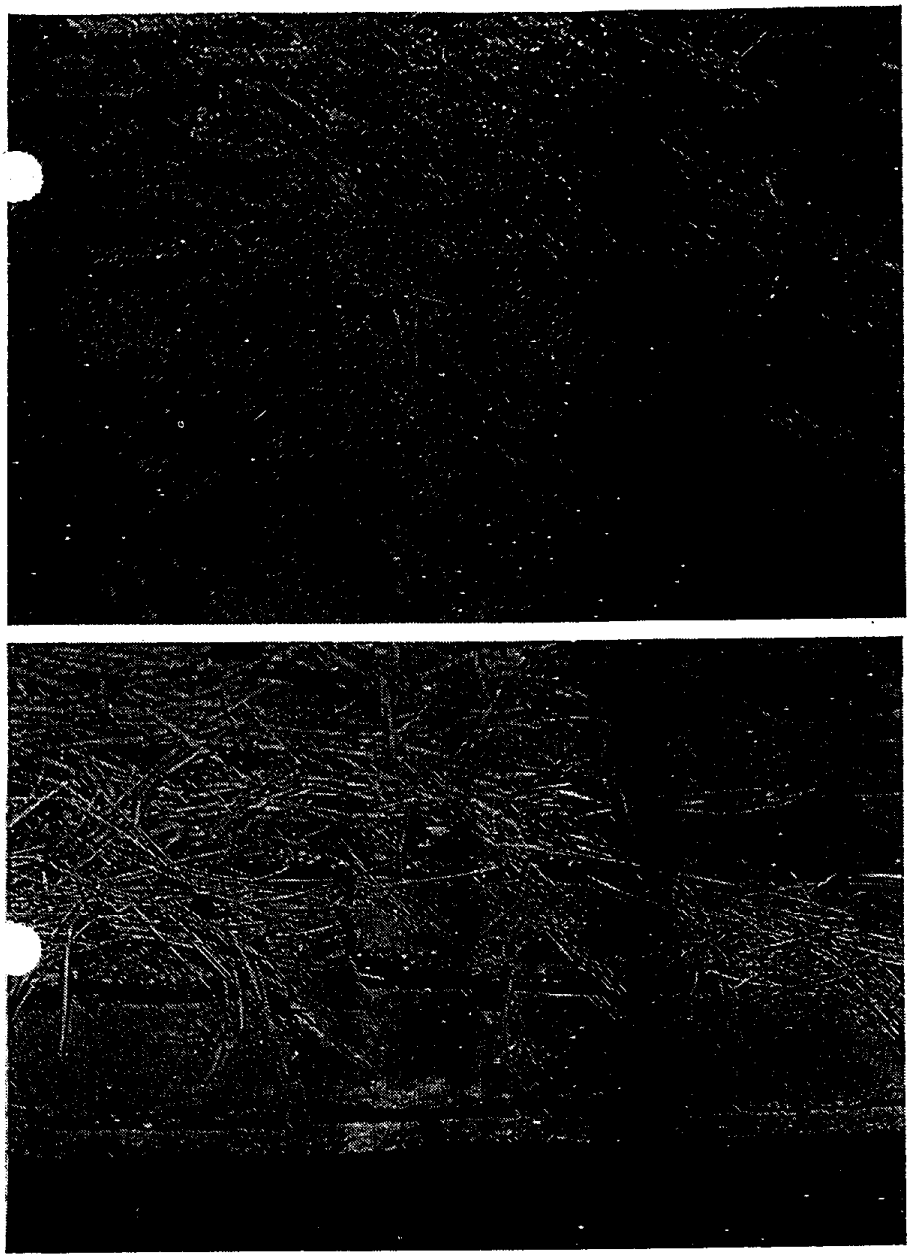


These 14-year-old untreated shingles (top) in the humid Houston area show severe decay, splitting, and heavy accumulations of moss and lichen. Organic debris left on the roof (bottom) traps moisture and hastens decay.

fungi. The natural decay resistance of western red cedar is due to its heartwood extractives, including the *thujaplicins* and a variety of *phenolic compounds.* The thujaplicins contribute to the decay resistance of red cedar while the phenolic compounds and resins give cedar its water repellency and *lubricity* (slippery surface).

Since the natural preservatives in cedar are somewhat water soluble, they ı be depleted in service. In roof exposure, extractives may leach out in a relatively short time and allow colonization by wood-inhabiting fungi. Aided by favorable climatic conditions, these in turn allow the growth of wood destroying fungi, which ultimately cause the early failure of a roof. The wood becomes soft and spongy, stringy, pitted, and cracked or crumbly. This usually occurs first at the butt region of the shingles where they overlap.

An added factor is that more shakes and shingles are being manufactured today from younger, less decay-resistant cedar since old, high-thujaplicin-content logs are no longer readily available. This shortens the roof's life expectancy even more.

Repair Procedures

Replacement. One common way to spot-repair demaged or decayed shingles is merely to replace them with new ones.

Tools required for shingle replacement are: roofing hammer, metal hacksaw blade or heavy wire cutters, a wood block, a nail set, shingle nails (hot-dipped galvanized), and new No. 1 grade shingles or shakes.

The replacement of a shingle or shake can be completed in seven easy steps:

1. Split the old shingle using the blade end of the roofing hammer, in line with the original attachment nails.
2. Then remove the broken shingle with the serrated head of the roofing

How fast a wood roof weathers is a function of slope, direction, and shading. The shallower a roof is, the more likely it is to suffer decay from fungi. South-facing slopes suffer because they experience the greatest swings in temperature and humidity—leading to more splits and other degradation. Shade is also a concern. Wood roofs shaded by trees are more likely to develop mold, mildew, and decay than unshaded roofs.

Shake and Shingle Quality

Grade No. 1 (Blue Label) shingles and shakes in the past were cut from 100-percent clear, vertical-grain heartwood. However, grading standards have been relaxed over the years allowing more flat-grain and defects. These shakes and shingles are particularly susceptible to cupping, curling, and splitting. Improper nailing, nailing too high or too far in from the edge, only worsens the problem.

To Repair or Not

The older the roof, the more difficult it is to repair satisfactorily (see "Repair Procedures"). Although you can salvage a roof that requires as many as 30 repairs per square, it may not be cost-effective. A good rule of thumb is that shingle roofs older than 20 years, and shake roofs older than 25 years, will be extremely difficult, if not impossible, to

hammer.

3. Saw or clip off the nail heads left just under the butt of the overlapping shingle.

4. Then drive a new shingle into the void until the butt is within approximately one inch of the butt line of the adjacent shingles.

5. At this point, toenail two nails (which should be about ½ inch longer than the original nails) through the shingle up under the overlapping shingle at a 45-degree angle.

6. Complete driving of the nails, using the nailset to avoid damaging the shingles.

7. After setting the nails, drive the shingle in by striking the wood block held against the butt of the shingle, until the butt of the new shingle is even with the shingle course line.

The entire process generally takes about five minutes to complete. *Under no circumstances* should new shingles be "facenailed" leaving the nailheads exposed. When face nailing, the nails tend to extrude and the shingles tend to crack through fastener holes in the weathered surface.

Repeated wetting of shingles causes them to swell, grabbing the nails and raising them. As the shingles dry, the wood shrinks, leaving the nails elevated. Over time, this can cause loose shingles and lost nails. In addition, as the wood ages, it tends to shrink, causing holes to enlarge, and leaving the nails loose in the nail holes.

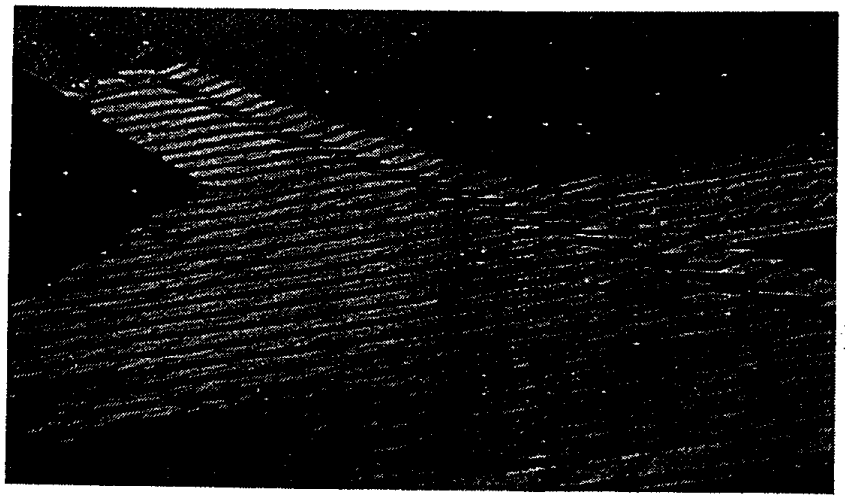
One problem with removing damaged or decayed shingles is that surrounding shingles can be loosened or broken.

Undershimming. Another method of spot repair, especially on older and more weathered roofs, is "undershimming." Undershimming involves placing a waterproof shim under the damaged shingle. Recommended shimming materials are heavy 45-pound roofing felt, aluminum, or galvanized sheet metal.

Undershimming is easily accomplished. With a claw hammer, the shingle is raised, and a 4x8-inch shim is slipped in under the shingle. Friction between the wood and the asphalt-impregnated felt is sufficient to hold the felt shim in place. Metal shims have either a rough burr on the surface, or the lower corners can be bent down to bite into the wood to hold the shim in place. The shim should not be visible after installation. Obviously this technique is only suitable when the shingles or shakes are split and not decayed or loose. This technique is faster and less expensive than replacing individual shingles and it doesn't disturb surrounding shingles.

Any wood roof that requires more than 30 repairs per square, such as this one, is probably not worth restoring. Shingle roofs over 20 years old and shake roofs over 30 may be too far gone.

Perma-Pine Shakes Are Here: Move Over, Red Cedar



Pressure-treated pine shakes will weather to an attractive buckskin tan—the same color as pressure-treated wood—regardless of climate.

Many home buyers choose cedar shingles for their natural decay-resistance as well as their beauty. In some regions of the country, cedar roofs can last 50 years or longer. In warm, moist areas, however, the service life of a wood roof rarely exceeds 15 years due to decay, curling, and splitting.

In addition, the future availability of good quality cedar shakes and shingles to the U.S. builder is in question. The timber supply in the Northwest is depleted and four-hundred-year-old trees take time to replace. So to meet consumer demand, in 1977, the Texas Forest Products Laboratory began research aimed at developing southern-yellow-pine shakes that would have the advantages of cedar, but be more durable, stronger, and best of all, more affordable.

Developing Grade Rules

Preliminary work centered around developing grade rules for manufacture. Early in the study, the group determined that it was not feasible to produce a handsplit-resawn pine shake, due to the prevalence of knots and irregular grain. They decided to concentrate on *sawing* shakes with butt widths of greater than ⅛ inch. These are called "taper-sawn shakes."

Literally thousands of pine shakes of varying dimensions were exposed to both long-term and accelerated testing. The first complete pine roof (3,000 square feet) was installed in 1979. The shakes used were nearly all quartersawn, but were allowed to contain all types of defects—knots, pitch pockets and crossgrain—to aid in developing grading rules. After one year, the roof was inspected. As expected, there was considerable splitting in those shakes with large percentages of "flat grain." This problem was solved by limiting the amount of flat grain and keeping it away from the center of the shake. Most of the problems encountered with the shakes on that particular roof were related to one or more of the following:

- Shakes too wide (over 8 inches)
- Presence of large, exposed knots
- Excessive flat grain
- Non-uniform butt thickness
- Density less than four rings per inch

Since then, the Forest Service covered 14 more office-building roofs, bringing the installed area of pine shingles up to about 65,000 square feet. Based on results from both accelerated- and long-term exposure testing, the Forest Service developed a set of manufacturing specs for pine-shake mills to follow.

Preservative Treatment

Since southern pine is not naturally resistant to decay or insect attack, it was a foregone conclusion that the pine shakes would need preservative treatment to ensure long-term durability. Preliminary results of *dip-treated* shakes were promising. But concerns were raised about the untreated wood cores being exposed where shakes were cut or trimmed on the job. With this in mind, the developers of the product decided to seek code approval only for *pressure-treated* shakes.

The three model codes—BOCA, UBC, and SBCCI—unanimously approved the use of pine shakes pressure-impregnated with preservatives according to the Amercian Wood Preservers Bureau (AWPB) Standards LP 2 and LP 3.

Before treating, the shakes must be dried to 19 percent moisture content or less. Since air drying in East Texas can take up to 65 days in summer or 160 days in winter, the shakes are kiln dried. Unlike western red-cedar, the pine shakes are easily treated using the full-cell process. Since the CCA will fix quite rapidly once the treated shakes are installed, kiln drying after treatment is neither required nor recommended.

Most plants treat to .40 pcf chromated-copper arsenate (CCA) and some now provide a 30-50-year warranty similar to that given for structural lumber by companies such as Koppers and Osmose. The labelling of the treated shake is monitored by one of the recognized agencies, Timber Products Inspection (TPI).

With the preservative treatment, the pine shakes will weather uniformly much the same as pressure-treated wood-decking—to a pleasing "buckskin-tan" color.

Installation

Pressure-treated taper-sawn pine

shakes are installed in essentially the same way as cedar shakes over spaced or solid decking. Minimum allowable roof pitch is 4-in-12.

Maximum weather exposure for 24- and 18-inch shakes are 10 and 7½ inches, respectively. In general, courses should be interlaid with 18-inch wide strips of 30-pound felt (see "Wood Shakes and Shingles," 5/87, for details).

The shakes should be installed about ¼- to ⅜-inch apart and adjacent courses offset by at least 1½ inches.

Nail with two (only) corrosion-resistant nails—hot-dipped galvanized, aluminum, or stainless-steel type 304-3/16, driven ¾ inch from each edge and 1 inch above the exposure line. Drive the nails flush, but don't crush the wood. Use No. 6 common galvanized nails, No. 6 Box, or 2-inch staples. Although staples are not recommended for cedar shakes or shingles because of their tendency to shoot through and leave a loose shingle, you can use them with the sawn pine shakes. Use a heavy, 16-gauge galvanized staple with 7/16 to ½-inch crown, and make sure the air pressure is adjusted to prevent "overdrive" of the staples.

Cost

Currently, pine shakes are sold in the neighborhood of $80 to $95 per square compared with cedar at $85 to $125. Ultimately, the superior performance of pine and its warranties will probably support prices higher than that of cedar. Currently four pine-shake mills are in production, with more mills expected to open over the next five years.

For more information, contact Brian Buchanan at the Texas Forest Service, P.O. Box 310, Lufkin, TX 75902; 409/639-8180. *This article was adapted from a paper given in 10/87 at a symposium sponsored by the Forest Products Reseach Society.*

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repair satisfactorily. In some geographic areas such as the Gulf States, repairs on shingle roofs over ten years old and shake roofs over 15 years old should not be attempted. Foot traffic on these roofs will cause considerable breakage or dislodge the shingles.

The final decision to repair, clean, and preservative-treat a wood roof is going to be a subjective one. There are no iron-clad rules. But don't go ahead with restoration if the benefits are questionable.

Cleaning with Bleach

Depending on the condition of the wood roof, there are two methods of cleaning prior to treatment: chemical cleaners (bleaching) and power washing. In many areas of the country, wood roofs are discolored primarily by sunlight and surface mildews or algae. These roofs can be cleaned quite easily and effectively with bleaching agents such as sodium hypochlorite (household bleach) or calcium hypochlorite (swimming-pool chlorine) mixed in tapwater. These chlorine solutions quickly remove the oxidized wood fibers on the shingle surface as well as kill surface mildews and algae. The roof is transformed from its initial dirty gray color to a "buff" or buckskin tan color.

To use liquid chlorine (Purex, Clorox, etc.): Mix one gallon of liquid bleach (5 percent sodium hypochlorite) with one gallon of water to remove mold, mildew, and the gray color. Higher concentrations of bleach (12 to 15 percent sodium hypochlorite) are available through commercial cleaning-supply companies. They can be diluted with water or used up to "full strength" if necessary to remove discoloration.

Stronger, more cost-effective chlorine solutions can be formulated using granular chlorine (calcium hypochlorite) mixed at a rate of 2 to 4 ounces per gallon of water. The type found at swimming pool supply companies (65-percent available chlorine) does a very good job of removing mildew and discoloration due to weathering. Bleach solutions are not effective, however, in removing dirt, rust stains, extractive stains, heavy moss, or lichen growth.

Whichever type of chlorine you use, you can apply the solution of chlorine and water to the roof using a typical garden-pump sprayer. Scrubbing or brushing is not necessary. Let the chemical do the work. The recommended coverage rate is 1 to 1½ gallons per hundred square feet of roof area. Let the solution stay on the roof 15 to 30 minutes, then rinse thoroughly with a high-pressure power washer or a garden hose. The high-pressure rinsing gives more dramatic results and aids in removing the oxidized wood fibers, plant organisms, and leaf debris from the roof.

Take care not to spray vegetation. If this does happen, rinse the plants thoroughly with water. Also, chlorine solutions are corrosive and should be applied using commercial spray equipment with stainless steel or plastic internal parts. Pump-up garden sprayers work fine for small roofs but are too slow and cumbersome for large jobs or commercial applications. High-pressure spray rigs or airless sprayers are not necessary to effectively bleach the wood. Pressures of 100 to 125 psi are adequate with flow rates of ½ to 1 gallon per minute. To minimize any possible damage to shrubbery and grass, the area should be sprayed with water thoroughly before, during, and after bleaching. This eliminates the need to cover shrubbery with plastic tarps.

Power Washing

Because certain forms of algae, moss, and lichen are unaffected by chlorine solutions, they must be mechanically removed using a high-pressure washer, similar to those used to clean automobiles. Power washing of wood roofs works quite well and is used extensively on the West Coast. Power washing essentially removes the top layer of wood fibers from the shingles much the same way sandblasters remove rust from metal. Take care not to damage the shingles by using too high a pressure. Pressures of 1,000 to 1,500 psi are generally adequate to clean the roof quickly and efficiently. Although power washing is slow and dirty work, the results are truly remarkable with the roof returning to its original cedar-brown color.

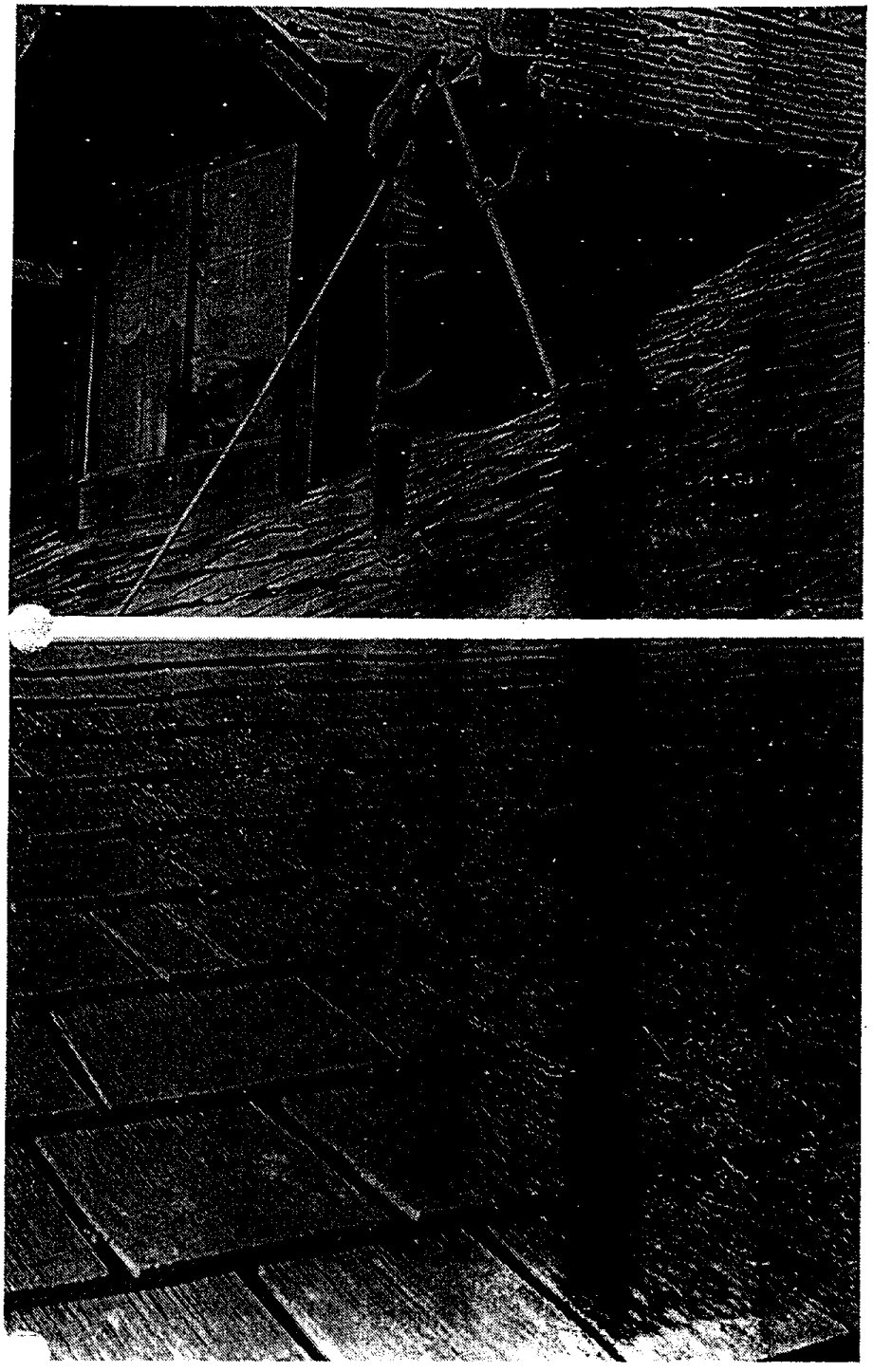
Power washers can be rented through local equipment rental companies or paint stores such as Sherwin Williams for $50 to $75 per day. Those wishing to purchase power washers should specify

that the units: be gasoline or diesel powered, provide 1,500 to 3,000 pounds pressure, and have a flow rate of 4 to 6 gallons per minute.

Power washing roofs is fairly straightforward. Always work from the top of the roof down, keeping your feet on the dry portion of the roof. Keep the spray wand moving a distance of 8-12 inches from the shingle surface. Use cold fresh water. Hot water washing or the use of strong soaps or cleaners is unnecessary. Experiment with various tip sizes to get the best results. A 15-degree spray fan is recommended.

Preservative Treatments

Until recently, it made little sense to preservative-treat an existing wood roof because of the low cost to replace. But as replacement costs rapidly approach $3 to $4 per square foot, the economics of preservative treatment look much better. One roofer's advertisement reads, "Why worry about a dirty roof? Because a clean and preserved roof looks a lot better than a re-roofer's bill!"



Power washing with water (top), popular in California, restores cedar roofs to their original brown color (bottom), even if they are covered with bleach-resistant lichen and algae. Power washers can be rented at many paint stores. Roofs that are merely discolored can be bleached instead, which is easier on the wood.

The high replacement costs of wood roofs and the development of new preservative finishes that are cheaper, less toxic, and more durable has made treating wood roofs feasible and desirable.

Since 1975, the Texas Forest Service (Forest Products Laboratory) has been evaluating preservative treatments for wood shakes and shingles. Results from both accelerated and long-term outdoor exposure tests indicate that a number of both water-borne and oil-borne treatments are quite effective in controlling the effects of weathering and decay for up to 5 years. The most effective products are those that contain one or more of the following:

- Copper octoate (1 percent metal content)
- Copper naphthenate (1 percent metal content)
- Zinc naphthenate (3 to 4 percent zinc metal content)
- Busan 1009 or Busan 1025 (2 to 5 percent TCMTB)
- Polyphase (.5 to 1 percent 3-iodo-2-propynyl butyl carbamate)

The following is a more detailed examination of these preservatives, their cost, availability, and use. They are ranked in order of overall performance. This ranking is based upon actual long-term outdoor exposure tests on wood roofing in East Texas.

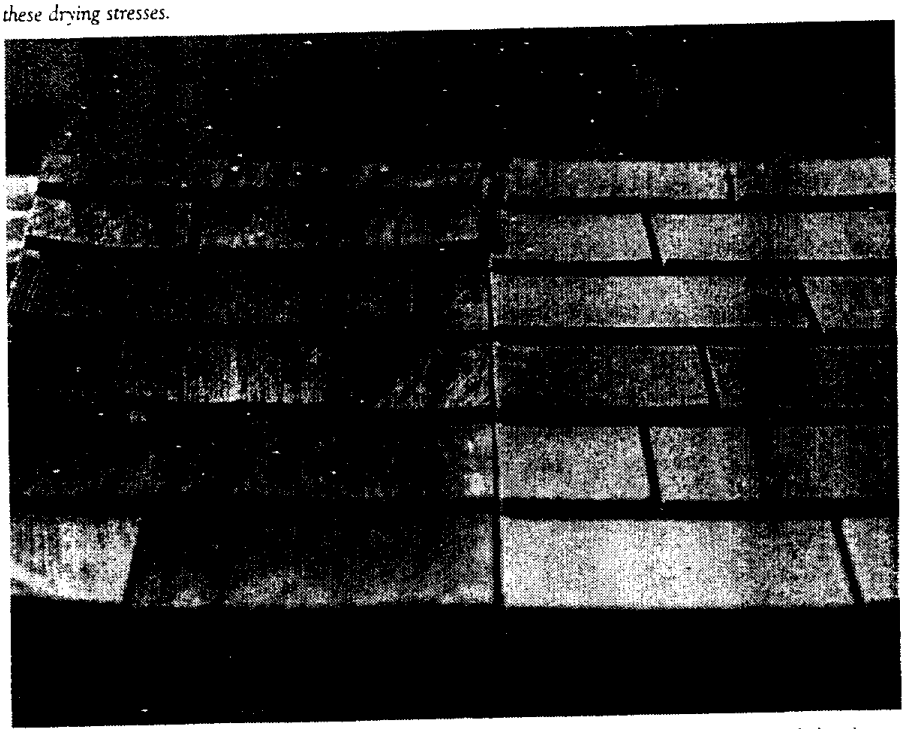
Water-Borne Preservatives

Cunapsol 5. For maximum mildew and decay resistance in a water-borne treatment, Cunapsol 5 is recommended. Cunapsol 5 (cut 1:4 with water) is quite popular with roof applicators in northern California and the Pacific Northwest because of its low cost and effectiveness in controlling moss and lichen growth. Because Cunapsol contains copper napthenate, it imparts an initial green color to the wood. If allowed to weather naturally, the color changes to a pleasing cedar brown. To hide the initial bright green color, you can pigment the Cunapsol

solution with Presco Cedar Brown Pigment or Millbrite 582 Pigment. Cunapsol 5 and the pigments are available from Chapman Chemical Company in Memphis, Tenn. (800/238-2523). Cunapsol 5 provides excellent mold, mildew, and decay resistance for up to 5 years or longer. But like other waterborne preservatives, it has *little effect* on cupping, curling, or splitting of the wood.

Busan 1009 (TCMTB). Busan 1009 is a liquid microbicide, which when mixed with water at a 2- to 5-percent concentration, provides effective mold and mildew control for up to three years. Outdoor exposure tests now in progress show Busan 1009 superior to zinc naphthenate in controlling surface discoloration due to molds and mildew. How well the Busan 1009 formulations will do over a five-year period remains to be seen. Current results lead me to recommend Busan 1009 at a 5- to 9-percent concentration as a suitable alternative to zinc.

These 12 year-old shingles from an arid climate suffer more from sunlight than wood decay: the UV breaks down the wood, leading to cupping, curling, and splitting. Oil-borne treatments are needed to fight these drying stresses.



In a side-by-side test, cedar shingles preservative treated when new (right), outshine untreated shingles (left) after four years of exposure in the humid Gulf Coast region.

Oil-Borne Preservatives

One of the main drawbacks of waterborne treatments is they do very little to control the drying effects of the sun and subsequent cupping, curling, splitting, and surface checking. A durable oil-borne preservative containing a suitable naphthenic or paraffinic oil will replenish the wood with oils that have been lost by sun and rainfall. Both naphthenic and paraffinic oils (when applicable) are resistant to oxidation by sunlight, do not contribute to the flammability of the treated wood, and are reasonable in price. Care should be taken to choose only those oils *not* restricted by the Federal Occupational Safety and Health Administration's (OSHA) Hazard Communication Standard (29 CFR Part 1910.1200) which became effective November 25, 1985. In essence, it states that certain oils manufactured today have been tested and concluded to be carcinogenic. As of November 25, 1985, these oils and any products that contain them, require special labeling. Please check with the oil supplier for clarification on this. Examples of good naphthenic oils are Chevron Shingle and Floor Oil or Sun Oil Co. Sunthene 410.

Copper octoate. New on the market copper octoate shows great promise not only in controlling mildew and decay but also in giving "life" back to aged wood when combined with a suitable naphthenic oil. A 10-percent concen

trate of copper octoate must be diluted 1:9 with naphthenic oil. Like Cunapsol, the preservative is green in color and therefore must be pigmented to provide natural-looking finishes for wood roofs. It is available in 55-gallon drums only.

Oil-soluble copper naphthenates. An alternative to copper octoate is copper naphthenate. Oil-soluble copper naphthenates are available from many suppliers including Mooney Chemicals in Cleveland, Ohio (8 percent MGARD S-520), and Continental Products in Euclid, Ohio (8 percent CNS Wood Preservative-Green). Pound for pound, copper naphthenate and copper octoate are equal in performance. However, the copper octoate is available in higher concentrations than copper naphthenate making it more cost-effective to large-volume users. In addition, there is less odor with the copper octoate.

Zinc naphthenates. Although zinc naphthenates in oil are readily available and in use in many areas of the country, I cannot recommend zinc naphthenate in oil at concentrations lower than 3 to 4 percent. In mildew-prone areas, particularly in the South, 1- to 2-percent zinc-naphthenate solutions are poor performers over time. They have some merit in areas not prone to mildew and decay. Price per gallon of 3-percent zinc-naphthenate solutions will vary from $4 to $7 a gallon. Zinc naphthenate is available from manufacturers such as Interstab Chemicals and Mooney Chemicals (MGARD S-150).

Because many of the suppliers and manufacturers of preservative treatments cannot by law or will not by choice, sell to the homeowner or applicator in small quantities, you should consider using the following treatments because of their availability, price and excellent performance. These are again ranked in order of overall performance and ease of use.

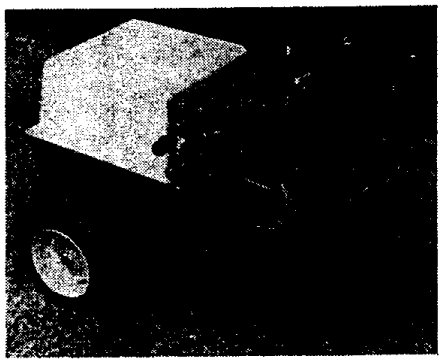
1. TWP Roof and Deck Sealant (Cedar 100 or 101 Cedartone HD), AMTECO, Inc. FSC Distributor San Diego, 619-558-0801
2. Natural Seal Clear X-100, American Building Restoration Chemicals, Inc.,
3. Cunapsol 1 (pigmented water-base), Blairstown Distributors;

The Texas Forest Products Laboratory is continually searching for new and effective finishes for wood roofing. The recommendations given in this report are based solely upon tests performed here in East Texas. The opinions given here are just that—opinions—and by no means should be interpreted as an official endorsement by the Texas Forest Service.

Equipment Needed for Roof Restoration

There are as many different designs for spray equipment as there are people who sell it. Because of its low cost and availability, the common garden sprayer is an easy and effective way of applying bleach solutions, water-borne preservatives, and preservatives in light solvent. It is not suited, however, for the naphthenic-oil treatments. Also note that this is a slow and cumbersome way to apply chemicals to the roof.

Many commercial applicators choose an airless sprayer such as those manufactured by Graco, Binks, or Hero. These are excellent choices but are quite expensive and "overqualified" for roof-restoration work.



Small commercial applicators can purchase spray equipment for bleach or preservatives from lawn-care or golf-course suppliers. This unit is the Suburban Sprayer from Continental Belton Co., in Belton, Texas.

A much cheaper and more reliable sprayer can be made with a diaphragm pump. Twin diaphragm pumps such as those available from Hypro Co. (New Brighton, Minn.), are an excellent choice for wood restoration work. They are economical, dependable, long-lived, and highly adaptable. They are capable of delivering oil- or water-borne chemicals to the roof with plenty of pressure and volume. Diaphragm pumps are superior to gear and piston pumps in handling the abrasiveness of preservative solutions, particularly those containing pigments or mildewcides.

For information on quality diaphragm sprayers, contact manufacturers that supply the lawn, turf, and pest control industry such as the Broyhill Company in Dakota City, Neb., or Oldham Chemicals Co. in Memphis, Tenn. Both provide complete sprayer packages including diaphragm pumps, storage tanks, hose reels, and spray guns. Most complete spray packages sell for under $2,000.

Sprayers can be truck-mounted or totally portable depending on personal preference. Truck-mounted units eliminate the need to continually move the sprayer around the job site. Everything is self-contained on the truck bed. Usually 300 feet of hose is adequate to reach most roofs. Manual or electric hose reels are advisable when using over 100 feet of hose. Pumps are usually driven by gasoline or diesel engines.

Spray guns can be purchased from companies such as Spraying Systems Co. in Wheaton, Ill. They should be the high-pressure type (800 to 3,000 psi capacity) with spray tips of .015 to .040 orifice and a 15- to 65-degree fan. Attaching a 18-inch extension wand to the gun makes the coating process less tiring. Longer wands up to 64 inches can provide greater reach but can be heavy. They are very useful where foot traffic on the roof is limited or dangerous.

Not Eternal

Wood shingle and shake roofs are not eternal, but they can provide long-lasting performance if cleaned and treated periodically. There are many products and techniques to choose from which offer varying degrees of protection. The worst thing to do, however is to do nothing at all.■

Brian Buchanan is a wood technologist at the Forest Products Laboratory in Lufkin, Texas.

TEXAS FOREST SERVICE

The Texas A&M University System

Forest Products Laboratory
(409) 639-8180

Hwy. 59S, P.O. Box 310
Lufkin, Texas 75901

9.93

January 16, 1990

Mr. Larry Cerenzie
Fiber Saver Coatings Distributors
4060 Morena Blvd., Suite P
San Diego, CA 92117

Dear Larry,

This letter is in response to your request for information concerning the preservative treatment of wood roofs to extend their service life. Please find enclosed our "Guide to Wood Roof Restoration" which provides up-to-date information on the repair, cleaning and preservative treatment of cedar shingles and shakes.

There have been and will continue to be debates concerning the best treatment for wood roofing in California, whether one should use water or oil borne preservatives, whether the treatments in fact are effective in extending the service life. As you know, since 1975, this laboratory has been involved in research to develop coatings and finishes for wood roofing to extend their service-life. Both commercial and experimental coatings are evaluated here to rate their performance in controlling mildew, decay and the drying effects of the sun over time. Treated panels are placed outside for long-term outdoor exposure here in Lufkin. Results from these tests allow us to make qualified, unbiased recommendations to applicators such as yourself as well as homeowners, as to the type treatment best suited for a particular locale. Because the Texas climate is most conducive to mildew and decay as well as extreme summer temperatures, we feel that products that perform well here will work equally as well or better in other areas of the country, particularly California.

Oil-Borne Vs. Water-Borne Treatments

One of the main drawbacks of water-borne treatments is they do very little to control the drying effects of the sun and subsequent cupping, curling, splitting and surface checking. A durable oil-borne preservative containing a suitable napthenic or parafinnic oil will "replenish" the wood with oils that have been lost by sun and rainfall. These oils are resistant to oxidation by sunlight and do not contribute to the flammability of the roof. In California, where the average rainfall is between 10 and 20 inches, wood roofs fail more so because of the effects of the sun and high roof temperatures than of decay. We therefore recommend wood roofs be treated with oil-borne rather than water-borne preservatives. Although oil-borne preservatives are somewhat more expensive than their water-borne counterparts, their superior performance more than compensates for the additional cost.

Oil-Borne Preservatives

There are a number of oil-borne preservatives available for the treatment of wood roofs. The most effective are those that contain .5-1.0% elemental copper. Because many copper containing preservatives must be pigmented to hide their inherent green color, there can be problems with the roofs showing uneven color loss and streaking. This is usually attributed to the fact that many preservatives do not contain resins to hold the pigment in the wood. This color loss and streaking can even be more pronounced when using water-borne copper solutions.

RADCON (Note: This is the same as TWP Roof and Deck Sealant)

There is now available in California a new product called "RADCON" which is gaining popularity because of its superior performance over conventional oil-borne copper solutions. Results from exposure tests here in Texas indicate both excellent color maintenance and mildew resistance. Treated shake and shingle panels take on a very pleasing "golden color" after a few weeks of exposure. The treatment dries much faster than conventional oil treatments which eliminates the problem of dirt accumulation and odor. RADCON should be applied every 5-7 years to insure good protection to the roof. Periodic applications of preservatives such as RADCON can double or even triple the remaining service life of the roof.

One thing is certain; the worst thing to do is do nothing. The roof will surely fail due to neglect. Consumers need to apply the same care to their roofs as they do to their siding, fencing, lawns and automobiles.

Are preservative treatments for wood roofs worth the cost and effort? Yes, with current replacement costs for wood roofing averaging $2.50 - $3.50 a square foot, one should strive to protect his investment.

I hope this information will be of help to you and your customers. If I can be of further service, please contact me.

Sincerely,

Brian Buchanan
Wood Technologist

BB/ss

Enc.

TWP PRODUCT COMPARISON CHAR FOR "NEW" WOOD

twpcomp1.wk4 - march 99

PRODUCT	% SOLIDS BY WEIGHT	VOC COMPL.	NEW WOOD	WALK DECKS	SUN DECKS	ROOFS	FURNITURE	ROUGH SIDING	SMOOTH SIDING	LOG CABINS	TEAK	DOORS	GOOD POINTS	DRAWBACKS
TWP TWP-100 SERIES EPA REGISTERED VERY GOOD SYSTEM FOR NEW WOOD BROAD SPECTRUM WOOD PRESERVATIVE FOR ALL FORMS OF WOOD ROT	18.5-40%	NO	VERY GOOD W/PREP	YES #2	YES #2	NO	YES #2	YES #1	YES #2	YES #2	YES #2	YES #2	12 YEAR HISTORY Good for new & aged wood; Good color selection; Fast & positive dry	Only Fair on New Mill-planed deck surfaces
TWP SHAKE & SHINGLE TWP-200 SERIES MAINLY FOR SHAKE & SHINGLE ROOFING	94-0.97	YES	YES LIMITED	YES #4	NO	YES #1 BEST	NO	YES #3	NO	YES #2	NO	NO	MAXIMUM PROTECTION-8 Year History Long Lasting; Transparent after cure; Minimizes wood cracking & splitting. Controls organic growth; #1 rated Roofing System.	SLOW DRY-Very dark after application-takes 100 to 120 days to lighten; don't use on decks; Pollution fallout requires cleaning
TWP DECK&FURNITURE **TWP-300 Series** POSITIVE DRY; NO "FREE" OIL; BEST NEW WOOD SYSTEM NON-SLIP HAS SHEEN	62-65%	YES	BEST #1 W/PREP	YES #1 FAST DRY BEST	YES #1 BEST	YES #2	YES #1 BEST	YES #1	YES #1 BEST	YES #1	YES #1 BEST	YES #1 BEST	VERY HIGH SOLIDS; TWP Colors; Positive & Quick Dry; Great on New mill-planed wood; Superior UV resistance. Good for Teak; Gives "Varnish Look" with 2 coats. Good choice for lower temps (50-65 degrees F)	Must wipe surface during application to minimize GLOSS; Will rebulk moderately aged wood, and does not penetrate as deeply as TWP 500 Series & TWP 200 Shake & shingle
TWP II TWP-500 Series LATEST TECHNOLOGY; BEST FOR "AGED" WOOD GREAT ALL-AROUND SYSTEM; FOR ALL APPLICATIONS; USER FRIENDLY	62-65%	YES	YES #3 LIMITED	YES #3	YES #3	YES #3	NO	YES #1 BEST	YES #3	YES #1	YES #3	YES #3	Good Color Selection; Latest UV & Water repellency technology; Reloads older wood with oil. Combines TWP colors with Shake & Shingle rebulking properties. Very versatile and easy to maintain.	Clean frequently; Slower Dry (4-14 days avg) Longer dry when cool/damp Recoat necessary in 6-12 m on new smooth wood (mill-planed).
TWP WATER-BORNE ACRYLIC TWP W-100 SERIES TWP COLORS PLUS GRAYS FULL BODY TO SEMI-TRANSPARENT BEST CHOICE FOR GRAY COLORS; MUST BE PRIMED WITH RECOMMENDED PRIMER	39-41%	YES	YES #1 W/PREP	YES #4	YES #4	YES #4	YES #3	YES #1	YES #4	YES #1	NO	YES #3	Longest Life Acrylic Stain available; water repellent; Latest UV protection; Superior color retention; Good over Old Linseed Oil & on decks or walkways.	Is a Film-former; Does not penetrate wood like Oil-based TWP product Will eventually show some peel.

******* RANKINGS: #1 Highest Ranking to #5 Lowest Ranking**

***** PRIME ALL NEW WOOD APPLICATIONS WITH: TWP NEW WOOD CONDITIONER**

TWP PRODUCT COMPARISON CHAR. FOR "AGED" WOOD

twpcomp2.wk4 - march 99

PRODUCT	% SOLIDS BY WEIGHT	VOC COMPL.	AGED WOOD	WALK DECKS	SUN DECKS	ROOFS	FURNITURE	ROUGH SIDING	SMOOTH SIDING	LOG CABINS	TEAK	DOORS	GOOD POINTS	DRAWBACKS
TWP TWP-100 SERIES EPA REGISTERED VERY GOOD SYSTEM FOR NEW WOOD BROAD SPECTRUM WOOD PRESERVATIVE FOR ALL FORMS OF WOOD ROT	20.5-40%	NO	VERY GOOD #2	YES #3	YES #2	NO	YES #2	YES #2	YES #2	YES #2	YES #2	YES #2	12 YEAR HISTORY Good for new & aged wood; Good color selection; Fast & positive dry	Only "Fair" on New Mill-planed deck surfaces Solids too low for extremely dried-out old wood.
TWP SHAKE & SHINGLE TWP-200 SERIES MAINLY FOR SHAKE & SHINGLE ROOFING	94-0.97%	YES	YES LIMITED	YES #3	NO	YES #1 BEST	NO	YES #3	YES #3	YES #3	NO	NO	MAXIMUM PROTECTION-8 Year History Long Lasting; Transparent after cure; Minimizes wood cracking & splitting. Controls organic growth; #1 rated Roofing System.	SLOW DRY-Very dark after application-takes 100 to 120 days to lighten; don't use on decks; Pollution fallout requires cleaning
TWP DECK&FURNITURE **TWP-300 Series** POSITIVE DRY; NO "FREE" OIL; BEST NEW WOOD SYSTEM NON-SLIP HAS SHEEN	62-65%	YES	YES #1	YES #1 FAST DRY	YES #1 BEST	YES #3	YES #1 BEST	YES #2	YES #1 BEST	YES #2	YES #1 BEST	YES #1 BEST	VERY HIGH SOLIDS; TWP Colors; Positive & Quick Dry; Great on New mill-planed wood; Superior UV resistance. Good for Teak; Gives "Varnish Look" with 2 coats. Good choice for lower temps (50-65 degrees F)	Must wipe surface during application to minimize GLOSS; Will rebulk moderately aged wood, but does not penetrate as deeply as TWP 500 Series & TWP 200 Shake & shingle
TWP II TWP-500 Series LATEST TECHNOLOGY; BEST FOR "AGED" WOOD GREAT ALL-AROUND SYSTEM; FOR ALL APPLICATIONS; USER FRIENDLY	62-65%	YES	YES #1 BEST	YES #1 SLOWER DRY	YES #3	YES #2	NO	YES #1 BEST	YES #1	YES #1 BEST	YES #3	YES #3	Good Color Selection; Latest UV & Water repellency technology; Reloads older wood with oil. Combines TWP colors with Shake & Shingle rebulking properties. Very versatile and easy to maintain.	Clean frequently; Slower Dry (4-14 days avg) Longer dry when cool/damp Recoat necessary in 6-12 mo on new smooth wood (mill-planed).
TWP WATER-BORNE ACRYLIC TWP W-100 SERIES TWP COLORS PLUS GRAYS FULL BODY TO SEMI-TRANSPARENT BEST CHOICE FOR GRAY COLORS; MUST BE PRIMED WITH RECOMMENDED PRIMER	39-41%	YES	YES #1	YES #4	YES #4	YES #3	YES #3	YES #1	YES #1	YES #3	NO	YES #3	Longest Life Acrylic Stain available; water repellent; Latest UV protection; Superior color retention; Good over Old Linseed Oil & Semi-Transparent systems.	Is a Film-former; Does not penetrate wood like Oil-based TWP product Will eventually show some peel.

***** **RANKINGS: #1 Highest Ranking to #5 Lowest Ranking**

Sales & Technical Information
FSC Coatings (858) 558-0800 or (800) 579-8459

TWP 200 Series -- Shake & Shingle

Product Data Sheet

TWP SHAKE & SHINGLE PRODUCT CODES:
200 Clear, 201 H.D. Cedartone, 202 H.D. Redwood, 203 H.D. Gold, 205 H.D. California Cedar, 206 H.D. Russett Brown, 207 H.D. Butternut Brown (medium brown), 210 H.D. Slate Gray (light to med grey). For Dark roof colors, call FSC concerning proper mixes.

PRODUCT DESCRIPTION:
A high solids heavy-duty penetrative coating, specifically designed to extend the service life of shakes and shingles. The primary function is to enhance structural integrity and appearance of aged roofing. The finish composition will minimize grain cracking, cupping, surface erosion, water absorption and surface attack from mildew and algae. Although the system is highly penetrative, the residual surface film is highly resistant to destructive organisms. The penetrative portion of the product absorbs into aged and porous wood, adding bulk to aged and brittle wood fiber. This restores lubricity and flexibility to brittle shingles. At 93%+ solids, these products comply with all federal and state V.O.C. (volatile organic compounds) regulations.

PRODUCT SELECTION: See Mold & Decay Climate Index Map

200 S.T. Clear: All applications where an aged silver to ash blond appearance is acceptable. TWP 200 Clear will allow greying of the wood--TWP 200 is not intended to maintain color. Greying will occur within 6-18 months. In coastal or high altitude areas with high Ultra-Violet radiation, nightly dew or excessive rainfall, use wood tone products #'s 201, 202, 203, 205, 206, 207, 210 for best results.

201 H.D. Cedartone: For moderate to severe use. The product has a high degree of transparency to minimize hiding natural appearance of wood grain. It is ideal for shingles that are in reasonably good shape and can be cleaned to a light buff or tan color with the recommended cleaning procedures. Use in areas with mold and decay indexes up to 90.

202 H.D. Redwood: Strictly for use where a redwood appearance is desirable. Recommended only for areas with an index of 90 or below. Do not use on white or light yellow woods, such as pine, spruce, or douglas fir.

203 H.D. Cedar Gold: Use for most severe conditions. It is slightly more opaque than 201 and provides additional protection from extreme ultraviolet rays. The additional color strength provides color uniformity on surfaces that remain dark after cleaning and exhibit burnout from intense radiation. It is the preferred product in southern coastal areas with a mold and decay index of 70-130 and in high UV light regions within the 0-30 index. Do not use on wood less than 10 yrs old as it will show "too yellow." Use straight if wood has considerable grey after power wash. Blend TWP 203 with 201 for most applications at 50:50 mix.

205 H.D. California Cedar: This product is designed to restore the natural cedar color for aged cedar installations. In restoration projects, it works perfectly in moderate and extreme climates (hot or cold). Great choice for surfaces that are dry and brittle and where cleaning still leaves a gray or dark surface. The net effect is to produce a more immediate color change to simulate newer wood. Good for trying to blend new and aged wood as in roofing repairs and additions.

206 H.D. Russet Brown: This product is designed to restore or maintain the natural cedar color for all cedar installations. In restoration projects, TWP 206 is perfect where the wood surface can be power washed to a relatively new appearing shingle (or shake) or where there is still life left in the roof (replacement of 15% or less of the roof is desirable).

207 H.D. Butternut Brown: Identical to 206 except that additional brown pigment has been added to produce a /arm, medium brown color. Same benefits as 205 & 206.

210 H.D. Slate Gray: Formulated to produce a pleasing light-to-medium grey semi-transparent tone similar to driftwood color. Same benefits as other pigmented colors.

PLEASE NOTE: ***Products 201-207 take approximately 6-8 weeks to achieve final color tone.*** *The products appear dark upon application. 201-203 may be intermixed for color modification.*

SURFACE PREPARATION & ROOF REPAIR:
Prior to cleaning, replace cracked or severely cupped shingles. If the surface is above 15% defective, it is advisable to re-roof. Pay special attention to ridge caps. For best appearance use good aged shingles from the back of the house to replace unusable shingles in the front. Insert new shingles in old shingles place in a concentrated area as close to the bottom as possible., This procedure will give the front of the home a more uniform appearance and keep the roof from having a blotchy appearance from the insertion of random new shingles. Replace shakes and shingles before cleaning.

When fastening new shingles, be sure to use non-ferrous nails or staples. Dip galvanized fasteners are preferred. Sound shakes with minor cracking which have not begun to cup may be underpinned with galvanized sheet metal or polypropylene slip-sheets cut to the overlaying shingle size. They are easily installed using an exterior grade construction adhesive. Use 15- 25 mil polypropylene sheet stock or standard thin gauge galvanize. Plastic is the easiest to install. Other plastics, such as flexible vinyl or Mylar may also be used. Run an adhesive bead on horizontal back edge and sides. Do not apply to bottom edge. Lift the cracked overlaying shingle slightly and slide the slip-sheet under the shingle with the adhesive faced down. Press the top shingle down to secure the slip-sheet to the shingle scraper to insure adhesive contact with the surface. Allow at least 24 hours before the roof is power washed.

ROOF CLEANING:
The surface must be cleaned to remove dirt, algae, moss, mildew and loose wood fiber. Depending on climate and age of the roof, one or all of the conditions may exist. The most common method is power washing without chemical assistance. This is acceptable in most instances where the roofing is in fair condition without excessive embrittlement. In situations where the surface contains excessive amounts of algae, black mildew and loose wood fiber, it is advisable to soak the surface with a bleach solution prior to cleaning. This will allow the use of lower pressure power washing, thereby reducing the risk of creating more damage from high pressure water blasting. Chlorine bleach will only help with organic growth removal and will HURT color retention. If new wood look is desired, use Z-90 Wood Magic or X-180 Wood Restorer after chlorine bleach application (after 1 day dry period) and power wash again.

IF ANY COATINGS ARE PRESENT, THEY MUST BE REMOVED (CHEMICAL STRIPPING MAY BE REQUIRED).

BLEACH SOLUTIONS:
For organic growth removal: Standard household bleach (Sodium Hypochlorite 5-6%) or commercial strength 12-13% can be used. Normal conditions require the bleach to be applied at 2-3% active. Cut household bleach 1:1 and commercial strength 1:5 with water. Application equipment varies greatly. The delivery pumping system should be low pressure in order to prevent misting. Components must be chemical resistant plastic or stainless steel. The objective is to deliver the solution to the surface with minimum overspray or pressure. Always start applying chemical at the bottom of the roofline. This prevents rundown of dirt and chemical into dry porous

surface. Pump-up garden sprayers such as Hudson2 (stainless steel) or Maya 2(plastic) are adequate where production time is not essential. Power washers with after pump chemical siphon feed work well for fast production. Make sure that the gun, pole and tip assembly is steel or stainless steel. Keep the equipment a minimum of 50 feet from the point of application and keep covered with plastic. The working life of the solution is 5-10 minutes. Follow up with power wash rinse to remove loose residue.

FOR "LIKE NEW WOOD APPEARANCE:" Use Z-90 Wood Magic or X-180 Wood Restorer diluted 4 parts water to 1 part Z-90 or X-180. Spray apply at 100-125 ft/gal with pump sprayer. After 10-15 minutes set time, power wash surface. Note: these products are not very effective for heavy organic growth removal; therefore use chlorine bleach application and power wash to remove organic growth with 1 day surface dry before using Z-90 or X180 when organic growth is present.

CAUTION: Do not allow bleach to come in contact with aluminum windows, doors or mechanical equipment. Keep plant foliage in the immediate application area wet. Take all measures possible to prevent misting. Wear rubber gloves, splash goggles, and any equipment deemed necessary for personal protection. Water rinse all application equipment *thoroughly after* use. Cover plants and foliage with plastic. In hot weather, remove plant cover as quickly as possible.

POWER WASHING: Standard power washers generating 1500-2500 p.s.i. are adequate. The size is somewhat dependent on the experience of the user. More powerful equipment may be used for faster cleaning, provided the user has the experience not to damage the surface. Proper technique requires roughly a 45% blast angle from the plane of the surface, disregarding the roof pitch. Operate at maximum pressure and adjust the tip distance to the surface short of fraying or splintering the wood. Always work with the grain. Pay special attention to the channel keyways and remove debris accumulation. Always work down slope. Apply vertical blast to remove debris from butt ends carefully. Trim old jumbo shakes with badly frayed ends with a *high-speed* rotary trim saw.

APPLICATION: After product selection and a minimum 24 hours of drying after cleaning, product may be applied. There are many pumping mechanisms to apply product. Avoid excessive overspray by adjusting pressure to minimize misting. Most commonly used is airless spray equipment in the 1/2 to 1-1/2 gals/min pump capacity. The gun assembly should include a 3-foot extension pole with a .032 to .040 swivel wide-angle spray tip. This will allow the applicator to keep the spray close to the surface and away from him. It is preferred to spray a 3' section laterally across the roof and ending the bottom of the pattern as close to the shingle butt line as possible. This is done to avoid lapping. This is not a two-coat system. See spread rate table for approximate coverage. Use mineral spirits for equipment cleanup and save for re-use. This product may not be disposed as conventional waste. Rinse containers before disposal.
DO NOT CONTAMINATE GROUND WATER OR OPEN WATER TO PREVENT DAMAGE TO AQUATIC LIFE. USE PERSONAL AND PROPERTY PROTECTION AS PROCEDURES PRESCRIBED IN THE MATERIAL SAFETY DATA SHEET. CLEAN UP OVERSPRAY WITH SOAP AND WATER. THE USER ACCEPTS RESPONSIBILITY FOR DISPOSAL OF WASTE AND EMPTY CONTAINERS IN ACCORDANCE WITH EXISTING GOVERNMENTAL STATUTES.

SPREAD RATE: Rates will vary depending on wood porosity.

ROOF AGE

	1 YEAR	3 YEARS	5 YEARS	5+ YEARS
Square Feet / Gallon	250	175-200	125-150	100-125

PHYSICAL DATA: (Typical for all colors)

Non-Volatile Solids: 94-96%	Weight Per Gallon:	7.4-7.6
Volatile Organic Solvent: 4-6%	Specific Gravity:	.88-.92
Non-Volatile Vehicle: 90-91%	Coating V.O.C.:	40-50 gr./l
Pigment: 2-4%		

THINNING: No thinning necessary above 70° F. Below 70° F add up to a maximum of 1-quart/5 gals. of mineral spirits. Do not apply below 50°F or to damp surfaces.

DRYTIME: These are semi-drying finishes designed for penetration. Surfaces are generally dry overnight. These products, *though* mostly used on shakes and shingles, are often used for other wood applications, such as fencing and log homes. **TWP Shake & Shingle is not recommended for Deck applications.** This product must be applied to porous unsealed surfaces.

PERSONAL SAFETY: Read Material Safety Data Sheet for additional information. To the best of our knowledge, the information contained herein is accurate. However, Amteco, Inc. does not assume any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability, of any material is the sole responsibility of the user.

Manufactured By: Amteco, Inc.
Sales & Technical Information: FSC Coatings (858) 558-0800 or (800) 579-8459

FSC COATINGS:
Phone 858-558-0800
Fax: 858-558-2159

TWP 300 SERIES DECK & FURNITURE STAIN

TWP 300 SERIES PRODUCT CODES:

300 CLEAR	305 CAPE COD GRAY
300 CLEAR "UV"	306 PRAIRIE GRAY
301 CEDARTONE	311 SPECIAL REDWOOD
302 REDWOOD	315 LIGHT CEDAR
303 DARK OAK	318 FOREST GREEN (Special Order Only)
304 BLACK WALNUT	

*Note: 300 Clear is available as a sealer or blending base only to be followed by a tinted topcoat. 300 Clear is designed to allow the wood to "grey" and will not maintain the original wood color. 300 Clear "UV" contains a ultra-violet protection package to slow the greying process and improve color retention.

PRODUCT DESCRIPTION:

A high performance penetrating oil-based surface sealer and weather protector for outdoor furniture and new wood. This VOC compliant, fast drying product is ultra-violet resistant and water repellant. In addition the TWP-300 Series Stain is specially formulated to produce a mold, mildew and fungus resistant film. It is perfect for picnic tables, wood benches, playground equipment, wood decks or new wood siding. It contains 60-65% solids but has no free oil to minimize dirt or soil attachment to treated surfaces. Being a positive dry product, it is also resistant to color rub-off on clothes when properly applied.

PRODUCT USES:

Vertical and horizontal new wood applications where positive dry is required. Perfect for old or new outdoor furniture, spas, picnic tables, benches, playground equipment, and other applications with direct human contact. Good for old and new decks where positive dry coating is a must.

SURFACE PREPARATION:

NEW WOOD: Apply a coat of "TWP New Wood Surface Conditioner" to all mill planed wood for deck use. This is optional for non traffic bearing surfaces. Make sure to remove dirt and dyer markings. The surface conditioner will enhance performance. All applications over the conditioner will result in glossy films. Let dry 48 hours before applying TWP Stains over TWP New Wood Conditioner.

OLD WOOD: Remove mildew and loose wood fiber by application of acceptable surface cleaner followed by power wash. Sand rough (checked) areas. Replace wood if severe checking or splintering is present. Old finishes must be stripped if they interfere with new coating penetration. Surface may then be finished with TWP for stain or gloss varnish coat appearance.

METHOD OF APPLICATION:

Dip, brush, roll or spray. Do not apply below 50 deg. F. Apply TWP 300 Series in thin, even coats and do not allow the material to puddle. **For varnish look** use TWP New Wood Surface Conditioner as a primer and sealer followed by TWP Deck & Furniture Stain at full strength (300-400 sq. ft./gal.) for new and aged wood applications. Two coats of TWP 300 Series are recommended. The second coat may be applied at 48-72 hours or after the first coat is dry to touch. The gloss finish properly cured provides optimum tracking and mar resistance to foot traffic. Do not wait longer than 1 week to apply the second coat.

TWP 300 Product Data Sheet Cont.

For low sheen, natural stain finish look, the surface must be wiped with a rag or applicator's pad after 15-30 minutes dwell time to minimize surface coating build-up. If not wiped, shiny areas will develop along grain lines or dense wood portions. Wiping to decrease the sheen will shorten the life of the finish.

Material should be thinned at 1 gallon Mineral Spirits to 5 gallons TWP Deck & Furniture Stain for improved penetration or to lighten color. **NOTE: Adding Mineral Spirits to this product will raise the VOC. If VOC compliance is required, this method is not recommended.

MAINTENANCE:

TWP Deck & Furniture Stain may be recoated with itself any time the surface shows aging. Apply very thin coats in order to minimize film build and insure proper cure. For furniture, benches, picnic tables, and direct human contact applications, it is recommended that this product be used for re-applications. Horizontal surfaces and hardwoods require more frequent applications than vertical applications.

SPREAD RATE:

New, mill-planed or solid powerwashed wood; 300-400 sq. ft./gal. over TWP New Wood Surface Conditioner for gloss varnish look. A second coat is recommended and may be necessary to achieve uniform gloss appearance. For stained effect on clean old and new surfaces; 200-500 sq. ft./gal., depending on porosity. For maximum durability, use the gloss finish procedure. Rough Sawn New Wood; 200- 300 sq. ft./gal., one coat only. Rough Sawn Old Wood; 150-200 sq. ft./gal., one coat only. For maximum durability pretreat rough sawn surfaces with "TWP NEW WOOD SURFACE CONDITIONER".

DRY TIME:

48-96 Hours depending on drying conditions.

THINNING & CLEAN-UP:

Mineral Spirits.

WARNING:

This product toxic to fish. Do not contaminate water by cleaning of equipment or disposal of wastes.

PHYSICAL DATA: (Typical for all colors)

SOLIDS BY WEIGHT: 62-65%

SOLIDS BY VOLUME: 55-57%

WEIGHT PER GALLON: 7.6-8.2

PIGMENT: 2-7%

COATING V.O.C: 347 grams/liter

Sales & Information: Contact FSC Coatings at 858-558-0800 or 800-579-8459

Manufactured By: Amteco, Inc.

FSC Coatings, Inc.
Phone: 858-558-0800
Fax: 858-558-2159

Product Data Sheet
TWP®--TOTAL WOOD PROTECTANT
500 SERIES (VOC COMPLIANT)

Exterior wood treatment that protects and enhances the natural warmth, beauty and integrity of both new and **old** wood, while complying with current Volatile Organic Compound (VOC) regulations.

PRODUCT SELECTION:

TWP-500 Natural Wood Preparation-Clear
TWP-501 Natural Cedar
TWP-502 Natural Redwood
TWP-503 Natural Dark Oak
TWP-504 Natural Black Walnut
TWP-511 California Redwood
TWP-515 Light Cedar

USES:

TWP-501 - TWP-515 provide deep penetrating films that are resistant to mildew, fungus, sunlight and moisture, while enhancing the natural color of wood. TWP-500 Clear offers the same protection, but will allow the wood color to fade and bleach out or "gray" naturally while resisting unsightly mildew growth. TWP 500 Clear is not designed to maintain the original color of the wood.

SURFACE PREPARATION: (Abbreviated Instructions-See FSC Procedure for detailed)

NEW WOOD: TWP New Wood Conditioner is recommended for all new wood applications-especially on smooth surfaces. The wood must be thoroughly soaked by rain or tap water and allowed to dry for at least 48 hours before product application. This opens surface grain for best product penetration.
UNTREATED OLD WOOD: It is likely to be gray from mildew growth. For mildew removal, apply a mixture 1:1 of liquid household bleach and water or power wash. For best results, bleach, then power wash. Surface must be thoroughly rinsed and dry before product application. All old coatings must be stripped. For color restoration, apply Z-90 Wood Magic and power wash.
SHAKES & SHINGLES: Allow new installations to age one summer for best results. For restoration of old shingles, follow old wood cleaning procedures including wood bleach with Z-90 Wood Magic and power wash. Strip old coatings and power wash.

APPLICATION:

Airless spray, conventional garden sprayer, brush and roller. **DO NOT PUDDLE** ON HORIZONTAL DECK SURFACES. Pick up or ıd out excess material that has not absorbed within 30 minutes. Apply at 60° F or warmer.

RECOAT:

A second coat may be required over very porous surfaces after 2 days dry on vertical or sidewall applications. Allow 30 days dry, before recoats (2nd coat) on decks. Remove and spread out excess material on flat surfaces. Do Not Puddle material on horizontal surfaces. **DO NOT APPLY THIS PRODUCT OVER PREVIOUSLY PAINTED OR SEALED SURFACES WITHOUT REMOVAL TO INSURE PENETRATION!**

COVERAGE: Mill planed new deck wood: 300-500 sq.ft./gallon per coat (wait 30-90 days before applying 2nd coat)
Rough sawn siding: 200-300 sq. ft./ gallon per coat (2-3 coats required for aged wood)
Old cedar shakes & shingles: 100-150 sq.ft./gallon per coat (2-3 coats required for aged wood)

MAINTENANCE: Avoid continual soaking of siding areas from sprinklers. Salt and chemical deposits remain on the surface after water evaporates and can be unsightly. When the finish ages for several years and begins to lose color, reapply a thin coat of TWP.

CLEAN UP: Use Mineral Spirits. On glass remove excess with mineral spirits and clean with sudsy ammonia cleaner.

DRY TIME: 2 days to 3 weeks depending on temperature & humidity.

TECHNICAL DATA

CODE NUMBER	%SOLIDS WEIGHT	%SOLIDS VOLUME	WEIGHT/ GALLON	VOC LBS/GAL	VISCOSITY
TWP500C	63.59	60.59	7.10	2.58	15" Z#2
TWP501C	63.15	59.70	7.17	2.65	<18" Z#2
TWP502C	63.85	60.31	7.20	2.61	<1 8" Z#2
TWP503C	62.10	58.76	7.13	2.70	<1 8" Z#2
TWP504C	64.20	60.98	7.15	2.56	<1 8" Z#2

F **Point:** All products - 105 deg. F. **DOT Classification:** Paint, Combustible Liquid, UN 1263.

To the best of our knowledge, the above technical data is true and accurate at the date of issuance, but is subject to change without notice. Liability, if any, is limited to the replacement of an equivalent amount of new product or refund of purchase price. This warranty specifically excludes labor or cost of labor.
Manufactured By: Amteco, Inc.

FSC COATINGS – Coatings Engineered For Ultimate Performance
Phone: (858) 558-0800 or (800) 579-8459 **Fax: (858) 558-2159**

PRODUCT DATA SHEET

2-605 GRAFFITTI MAX™

Exterior/Interior / Non-Yellowing / 100% Urethane / Clear Coat

PRODUCT DESCRIPTION

An extremely high performance, full gloss, graffiti resistant, clear coat for pre-existing high performance painted or structural substrates. The precatalized single package clear urethane has superior exterior gloss retention. Permanent ink marker, ball point pen, and all aerosol paint surface contamination may be removed--100% in most instances. For proper graffiti removal use **BST-100 BioStrip™**.

SURFACES

Restrooms, concrete/masonry products and wall construction. May be applied over most painted surfaces providing the finish does not lift or wrinkle existing finish. Apply small sample before proceeding. **Graffiti Max™** film should be clear, full gloss and free of surface defects other than what the profile supplies.

APPLICATION

Brush, roll or spray. **IMPORTANT NOTE:** It is absolutely essential to follow all safety precautions outlined in the Material Safety Data Sheet. Under no circumstances should this material be sprayed without all of the required protective equipment including goggles & respirator.

SPREAD RATE

Apply at 400-500 ft² per gallon over previously painted or non-porous surfaces. Over porous surfaces apply two coats. For maximum Graffiti resistance the finish should have full gloss appearance.

THINNING AND CLEANUP

Use Xylol or Methyl Ethyl Ketone for equipment. Throw away brushes and roller covers. Avoid skin contract with **Graffiti Max™**. Moisture accelerates cure, which makes removal from skin very difficult.

DRY TIME

Part of cure mechanism is activated by atmospheric moisture. Typical application exhibits hard dry in 3-4 hours at 75° F. & 50% R.H.

PHYSICAL PROPERTIES

VOLUME SOLIDS:	41.5%	VISCOSITY:	30-40 SEC.#4 Ford
WEIGHT SOLIDS:	47.8%	VOC:	515 gm./liter or 4.3 lbs./gal.

GRAFFITTI REMOVAL PROCEDURE

All testing has been conducted with **BST-100 BioStrip™**. **Ball point inks**--dab white cloth in **BST-100 BioStrip™** & remove ink, then wipe dry with clean cloth to remove any haze. **Permanent Marker**--Remove heavy ink as before. If slight shadowing is still visible, apply thin coat of **BST-100 BioStrip™** and let stand for 5-10 minutes. Rub area with cloth to remove remaining material and dry.

(grafmaxpds.doc—Dec1999)

Orders & Technical Info: FSC Coatings (858) 558-0800 or (800) 579-8459
Manufactured By: Amteco, Inc.
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FIBER SAVER COATINGS, INC.
MANUFACTURER'S REPRESENTATIVES
Featuring:
• AMTECO TWP Natural Wood Finishes, Coatings and Paints • Futura Roofing and Coatings Systems
• Seal Krete Masonry and Concrete Sealers • Gemini Coatings and Lacquers • All Deck Systems

The A-B-C's Of Graffiti Control

And Removal (Revised 1/95)

by Lawrence W. Cerenzie

One only has to drive the Los Angeles or San Diego Freeways to recognize the extent of the graffiti control problem. During the past year, we have received calls from Utah, Oregon, Washington, Alaska, New Mexico, Michigan, Mexico and many other states and foreign locations trying to figure out how to control, protect against and/or eliminate graffiti in one form or another. I even recently viewed a TV program in Los Angeles where the hosts were giving full TV exposure to name graffiti artists and their high quality work. The problem was that their "painting canvas" was yours and my fences, buildings, vehicles, doors, windows and so forth. I could not believe what I was seeing or hearing.

During this "educational program" I could not help but think of the thousands -- no millions -- of property owners pulling their hair out (provided they still have some) trying to figure out ways to keep their properties looking attractive. Good graffiti control measures have been shown to be the best deterrents to repeated "hits". Quick removal of graffiti has shown to discourage these "graffiti artists" since they want their work to be left for all to see. Unfortunately, these graffiti control measures cost us all millions in direct out-of-pocket expenses and indirectly through tax increases.

Article Intent

The intent of this article is to educate the individual property owner as to the options available to him and tradeoffs in the protective coating selection process. Our discussions will include a comparison of the various families of graffiti control coatings as well as the most effective strippers for graffiti removal from a performance and health safety approach. From these discussions, it is my hope that each property owner can develop a personalized graffiti control strategy that will best fit their pocketbook and meet their particular objectives.

Reader feedback from previous technical articles has shown that specific product recommendations are necessary for the reader to implement the ideas and concepts presented. We have followed that format in this article. The materials (and generic equivalents in some cases) mentioned here can be purchased through many local paint stores nationwide.

One must be aware that there is no single right answer to accomplish the graffiti control task given the various types of surfaces and desired looks. In fact several different approaches will probably be necessary on any large project given the variety of surfaces and finishes involved. However, some solutions will be obvious for you and feel right for your conditions.

5360 Eastgate Mall Road, Suite F • San Diego, CA 92121 • (619) 558-0800

The First Key To Successful Graffiti Control:

Identification Of Graffiti Type That Must Be Protected Against: 1) Spray Paint Only Or 2) Spray Paint And Permanent Markers

At this stage, one must determine which general type of graffiti that a particular location will be most likely to experience: 1) spray paint only or 2) permanent markers only or 3) spray paint and permanent markers. Generally, people guess spray paint tougher to remove than marking pens. However, it turns out that permanent markers are normally tougher to remove due to the unique alcohol solvent and dye system that characterizes this graffiti source. Therefore, we will consider Cases 2 and 3 together since the answer for both cases is the same. The high quality sacrificial systems and our graffiti resistant paints generally offer excellent protection from spray paint (Case 1) but only moderate resistance to markers.

Though not perfect, the aliphatic polyester urethanes, certain moisture-cured urethanes and the proprietary polyvinyl alcohol products (such as Graf Barrier) are the most marker pen resistant and spray paint resistant (Cases 2 and 3) product type (and most expensive). However, most graffiti tends to be of the spray paint variety (Case 1) which makes our protection job much easier allowing the use of less expensive product family types in many areas. Park benches, planters, trash cans, bathroom and picnic tables tend to be more prone to permanent marker type graffiti, and hence, would be a candidate for the aliphatic polyester urethanes, moisture-cured urethanes and Graf Barrier.

The Second Key To Successful Graffiti Control:

QUICK REMOVAL

The key to successful removal is timely action. The longer the graffiti sits, the tougher the spray paint or marker becomes. Time allows a more thorough cure of the applied graffiti. Hence, fast action after a graffiti hit is essential for an effective removal. As discussed previously, quick removal is also discouraging to the graffiti artist. Some data has suggested that three graffiti hits with repeated quick removal will dissuade graffiti artists and dramatically reduce the likelihood of repeated occurrences. In any case quick removal is the key.

The Third Key To Successful Graffiti Control:

Proper Graffiti Removal Techniques And Materials

We suggest that an owner or maintenance manager invest in 4 different strippers for graffiti removal. Unfortunately, each paint resin family has a little different response to a given stripper. Generally, we have found that the totally biodegradable BioStrip (AMTECO registered trademark) will do a very good job of removing most graffiti from surfaces with anti-graffiti coatings applied (it also does a good job removing graffiti from unprotected surfaces but removal is definitely more time consuming and not as complete without anti-graffiti surface protection). Bio-Strip is our first choice since disposal is not a problem unless lead based paint is removed. The other strippers are necessary to

handle the wide variety of other paints or graffiti agents with which one might "hit" and that BioStrip may not remove. The 4 recommended strippers are as follows:

1) Bio-Strip as discussed.

2) High Methylene Chloride content aircraft stripper (such as American Building Restoration's 700XX) is our second choice.

3) A high caustic content stripper (such as ABR's 800 Brush Grade) is our third choice but must be neutralized with acid.

4) ABR's one of a kind Poultice Stain Remover Type 3 is a must for removing deeply embedded graffiti from block, stucco and other porous substrates.

The above materials are potent stripping materials and require appropriate personnel and landscape protection. The Bio-Strip is the "nicest" to use from a people perspective. It is worthy to mention that power washing with hot water after stripping always increases the effectiveness of paint removal.

The Popular "Let's Just Paint Over It Fix" Does Not Work --
Numerous folks have tried just painting over graffiti. We have all seen the evidence of this technique with the "patchwork quilt" look along building walls, fences and freeway structures. Besides being ugly, most people do not realize that paint will start to fail due to a shearing action from the weight of multiple layers -- normally 5-7 coats (15-20 dry mil thickness). When that critical thickness is reached, the paint will start to peel leaving various layers exposed.

This peeling is happening in Los Angeles along the freeways where yellow from one layer shows, orange from a second layer shows and blue from yet another layer is apparent. It looks horrible with the only cure being sandblasting or chemical stripping -- very expensive. The lesson to be learned from this mistake is that there is no "quick fix" in fighting the graffiti problem.

The Fourth Key To Successful Graffiti Control

Selecting Anti-Graffiti Coatings And Paints

Graffiti control for painted or unpainted masonry, stucco, wood or metal surfaces can be accomplished in several ways. Our discussions will be centered around the basic decisions that must be made as follows: 1) whether to use permanent or sacrificial coatings; 2) whether to protect against spray paint only or permanent marking plus spray paint and 3) whether to use transparent or pigmented (colored) protective, anti-graffiti coatings.

Permanent VS Sacrificial Coatings

When referring to anti-graffiti coatings, a permanent system is generally defined as a coating or paint that is not removed during the graffiti clean-up operation. When graffiti is applied, permanent

systems are generally cleaned with a light stripper (possibly power washed) with normally minimal effect on the original coating. True polyurethanes, AMETCO's new Graf Barrier and the "Graffiti No More" version of AMTECO's Maxlife and TWP water-borne systems are considered permanent coatings. Epoxies are not considered good candidates since they generally break down very quickly in the presence of sunlight (UV).

Permanent coating materials can be very cost effective since no additional protective coating is required to achieve a high level of graffiti resistance. These types of systems are particularly attractive for apartments, schools, large condominium projects, utilities, public buildings of all types, large amusement parks (such as PIER 39 in San Francisco), transportation authorities (bridges, signs, overpasses, etc.) and industrial parks.

Low Sheen, "Clear" Solution For Stucco And Other Masonry

Of all the permanent materials of which I am aware, only Graf Barrier maintains a true low sheen or matte finish for masonry walls of all kinds: stucco, block, brick or concrete. In many cases, Graf Barrier cannot be detected as being present.

A Word Of Caution

The reader must remember that repainting or recoating an anti-graffiti system that is designed to be resistant to paints or coatings will require more substantial (and more costly) surface preparation work. This is particularly true of the super polyurethanes mentioned herein. If frequent color changes are a regular occurrence due to the particular type of business one is engaged in, permanent coatings (particularly polyurethanes) may not be a good option. It should be noted that Graf Barrier and Graffiti No More Paints can be easily recoated following a special preparation procedure.

Polyurethanes As Permanent Coatings

Usually polyurethanes are considered permanent coatings since when properly applied (and of the right urethane type) the premium aliphatic systems can last 10-15 years and graffiti can generally be removed without stripping the urethane. We are only recommending solvent-borne aliphatic urethanes in this discussion because of their superior chemical & moisture resistance as well as lower applied cost when compared to the currently available water-borne urethane technologies that we have evaluated to date.

1) Exterior Clear Sealers -- For clear urethane sealing applications of masonry walls, park benches, trash cans and exposed aggregate walls, one should only consider aliphatic polyester urethanes (cost $80-120 per gallon) or aliphatic moisture cured urethanes (less expensive, $60-100 per gallon) for exterior applications where maintaining clarity of film (non-yellowing) and appearance are important. These types of materials are used in heavy duty, industrial environments where solvent and chemical resistance is a must. These types of coatings are very resistant to permanent markers (Magic Marker or equivalent) and the strong solvent systems present in some solvent-based coatings. **Graffiti Max, which falls into these categories, is the most graffiti resistant and physically the strongest polyurethane that we know of -- quite a statement !!!**

Some clear urethanes cost as low as $30-45 per gallon. The low cost varieties unfortunately are one of the following: 1) aromatic urethanes which yellow when exposed to sunlight, 2) very low solids (lots of solvent or water with very little urethane) or 3) lower grade, low solid acrylic urethanes which

are usually much less graffiti resistant. The recommended, high quality urethanes will cost more but last and protect much longer. In general, water-borne urethanes have less than desirable water resistance for standing water or routine wetting scenarios.

It should be noted that these materials tend to give a full "wet look" gloss which is undesirable for many masonry applications (particularly on stucco and special decorative blocks & bricks like split face or slump stone).

2) Colored Or Pigmented Polyurethanes -- Where pigmented coatings or paints are desirable and permanent markers are not considered as a big problem, lower cost alternatives are available. For areas that have special VOC solvent emissions requirements (California; some East Coast states; some areas in Texas; areas around Phoenix, Arizona; and so forth) these systems will range from $60-90 per gallon. For areas without such environmental regulation, costs may range from $45-$90 depending on the solids (per cent of active ingredients) content.

Generally, pigmented urethanes are considered for long life metal applications. We have used a very tough, high performance 2 component acrylic aliphatic urethane system on PIER 39's metal doors, railings, bollards (ship tie-downs), structural members and bracing because of its excellent weathering and color maintenance properties.

New Technology, Low Cost Replacement For Urethanes

However, recent testing over the last few years on PIER 39 has shown that our new SA-3 Silicone Alkyd system over the ZERO RUST primer has many of the favorable high strength and gloss retention properties of urethanes which make it ideal for metal applications where graffiti control and high gloss retention are a must. What makes the success of this new silicone alkyd technology so exciting is that this performance is being achieved at a much lower price and in very low odor formulations (big advantages over urethane systems in general). PIER 39's maintenance personnel have reported that after a 30 day cure period, graffiti as knife carving and scratch damage has almost been eliminated in areas where it was previously a significant problem because of the unique strength and shear properties of the SA-3 Silicone Alkyd system.

Economical New Water-borne Paint Technologies As Permanent Anti-Graffiti Coatings: "Graffiti No More"

AMTECO has developed tremendously effective, graffiti resistant version of their TWP Water-borne Stain System that has proven to be excellent performer on San Francisco's famed PIER 39. This new, optimized system is appropriately named "Graffiti No More". Dave Carter, Maintenance Superintendent for Pier 39, has reported that spray paint graffiti is easily removed using light stripper solutions without leaving shadows. These materials have made graffiti a very easy problem to deal with and saved incredible amounts of labor and materials. The key to their durability and graffiti resistance is that they are essentially highly modified, chemically enhanced, acrylic systems designed for tough desert, onshore and offshore exposures.

These "Graffiti No More" materials are routinely used on wood, masonry, stucco and galvanized metal surfaces. This technology is available as a stain (40% solids) and a paint (more pigment and hiding capacity than a full body stain) with a very high solids content ranging from 50-55% depending on color.

The special "Graffiti No More" Paint System is considered permanent with an expected life ranging from 7-10 years (without graffiti hits) depending on the service and actual exposure. The big advantage of the "Graffiti No More" coatings over urethanes is much lower cost since they typically run between $20-25/gallon. Some versions of this technology have lasted over 10 years without chalk, fade or peel in true southern exposures (toughest possible weather orientation) -- the very best paint performance I have ever seen. For planning and budgeting I would figure 7-10 years.

Some touch-up will be necessary over the life of the system, especially if repeated graffiti hits occur over the same areas of the paint or stain. The amount of touch-up is directly related to the skill of the removal personnel, cleaning tools used, the type of stripper used and stripper dwell time. Because these systems have such a long life and are tremendously fade resistant, touch-up even after a few years is usually not a problem as long as material from the original batch is used for the touch-up.

New Transparent, Low Sheen Permanent Technology -- And Its Not A Urethane !! -- As mentioned above, a new product called Graf Barrier (not to be confused with sacrificial Graffiti Barrier by Seal-Krete) has shown tremendous potential in various masonry and painted surface applications. This material is water-borne which means that it can be applied over latex paint systems without affecting their adhesion to the substrate. Graf Barrier has an expected life of 3-7 years depending on the actual service and number of graffiti hits. At $50-70/gal, Graf Barrier is more expensive than the best sacrificial coatings but significantly less than the more expensive aliphatic urethanes. It also can be easily removed with a special procedure for easy repaints as the underlying paint system breaks down from exposure to the sun and weather. This system is worthy of consideration for painted surface applications where a long life graffiti-resistant clear coat is desired.

Leaving a matte finish, Graf Barrier also makes a tremendous permanent coating for unpainted masonry -- stucco, brick or block. By using the clear sealer, Prime & Seal, as the sealer/primer followed by 1-2 coats of Graf Barrier, tremendous graffiti resistance as well weather resistance is developed. This is the best choice for permanent protection of most masonry and previously painted surfaces from weather or graffiti while still maintaining a matte or low sheen finish.

Sacrificial Systems

Sacrificial systems are generally clear, water-based wax emulsions in acrylic or other resin complexes. When hit with graffiti, the systems are generally stripped with graffiti attached to the coating by paint strippers or power washing or both. The coating is simply reapplied to the affected areas after graffiti removal. Most of these clear systems have expected lives ranging from 1-3 years. They can be used on painted and unpainted wood, metal and masonry surfaces. Depending on quality and volume, these systems generally range from $20-$40 per gallon for volume customers.

Our experience and the experience of our customers has shown many of these systems are difficult to remove or are quite permeable to the graffiti. Based on this experience, 2 sacrificial graffiti systems are recommended: ABR's PolyShield and Seal-Krete's Graffiti Barrier.

With a 5 year track record and expected life in the 3-5 year range, the PolyShield Systems has shown excellent results in a number of applications including service for the Chicago Transit Authority subway cars and facility structures (painted and unpainted surfaces of all types). It has been used by

numerous public and private clients including school districts, public works projects, Macy's Department Stores, Target Stores, home fences and so forth over the last few years.

Another sacrificial system showing great promise is Graffiti Barrier. This system is very graffiti resistant (possibly the most resistant sacrificial system we have seen) and very easy to remove with water or strippers. At present, Graffiti Barrier is so easy to remove that direct weather exposure to rain or sprinklers is not recommended. It is perfect for use in areas without direct exposure to water or rain such as covered walkways.

There are some less expensive wax emulsions on the market with very low or zero resin/binder content. The problem seems to be durability and long term appearance. Some materials have been shown to attract dirt requiring regular power washing and material reapplication to maintain a proper appearance. So be careful when buying some of the low cost systems -- one day you may wake up with a little surprise that lasts a long time.

The Fifth Key To Successful Graffiti Control:

Developing Your Own Custom Program

In the next few paragraphs, I will share some thoughts based on the discussions of each of the four previous sections that will hopefully address your particular needs. The result of this section should be a general framework for your own particular graffiti control program. In each paragraph I will make an assumption and do my best to address how to handle that particular case.

Case 1: Your Project Has Recently Been Painted.
In this case either the permanent clear coat Graf Barrier (longest lasting, most durable and most cost effective over the long run) or the sacrificial systems (lowest initial cost) would generally be your best bets. If permanent markers are a problem, Graf Barrier is generally the best answer over water-based paints.

Case 2: Your Project Needs Painting
Generally, I would say use the "Graffiti No More" paint. At this point I am not aware of another paint or stain system offering these superior anti-graffiti properties. If permanent markers are a problem, "Graffiti No More" Paint followed by 1-2 topcoats of Graf Barrier (2 coats of Graf Barrier best) is worthy of consideration. (Note: Surface conditioning or priming will be necessary if the surface is currently chalky, peeling, "punky" or if significant organic growth is present.)

Case 3: You Have Unsealed Masonry Or Stucco In Your Project.

Alternative A: Permanent Urethane "Wet Look" -- The longest lasting but most expensive system will be a moisture cured 100% urethane called Graffiti Max. If permanent markers are a problem, an aliphatic/polyester two component urethane is the next best choice.

Alternative B: Permanent Coating With Little Change to Surface Sheen -- The surface should be sealed and primed with Prime & Seal followed by 1-2 coats of Graf Barrier. This system will stop liquid water migration though the protected surface minimizing certain types of efflorescence as well as yield tremendous graffiti resistance. Cleaning dirt or graffiti from a surface protected by

Graf Barrier will be very simple.

Alternative C: Sacrificial Clear Systems With Low Sheen or High Gloss -- The least expensive initial cost method would be use of a system like PolyShield For Unpainted Masonry (clear sealer) to provide sealing benefits as well excellent graffiti resistance properties. For cost efficiency, the surface should be sealed with Seal-Krete Masonry Sealer or Prime & Seal prior to coating with PolyShield. Be sure to consider gloss options in your decision. Remember, sacrificial systems must be routinely reapplied following graffiti removal which means higher long term labor costs.

Alternative D: You Want To Change The Color Or Look Of Your Masonry Or Stucco -- This scenario generally implies painting or staining the masonry surface. For very good graffiti protection and fantastic weather resistance, use 2 coats of Graffiti No More paint over a heavy Prime & Seal primer/sealer coat. This is the least costly way to accomplish these objectives. If maximum graffiti resistance is desired, apply Graf Barrier over the top of one coat "Graffiti No More" Paint (use Prime & Seal as primer).

Case 4: You Have Steel Buildings Or Wrought Iron Fences.

In this case the urethanes are your best bet. Surface preparation, primer selection plus proper thickness and mixture control are key. If you are painting over aged galvanize, the "Graffiti No More" Systems would work great. Working with metals requires someone who knows what they are doing. Special instructions are warranted here. The SA-3 Silicone Alkyd Systems would also make a good choice at a lower cost here where high gloss retention is desired.

Case 5: You Have Natural Wood Siding, Decking Or Fencing.

If your natural wood is presently protected, apply a sacrificial coating like PolyShield. If it is not coated, the first step is to seal the wood with an extremely water repellent system like TWP Deck & Furniture (300 Series) or TWP II (500 Series) -- apply two coats. Recent testing has shown both of these TWP systems to be tremendously effective to markers and spray paint. As a result of this test work, TWP has been specified on several schools being built in Santa Monica and Riverside County (Los Angeles area). If this does not work sufficiently then apply a permanent system such as a moisture cured urethane or sacrificial system such as PolyShield as your true graffiti protection.

In Conclusion

Hopefully, this article helps you to select your proper course of action. We have attempted to explain what should be used and where from surface protection, appearance and graffiti control viewpoints. If you have any questions, someone in our office will be glad to assist you (619-558-0800). I wish you many happy days free from graffiti problems.

About The Author. . .

With 20 years experience in the materials technology and protective coatings arena, Larry Cerenzie has been involved in projects ranging from the Trans-Alaskan Pipeline and Alaskan North Slope oil fields, to the design and construction of multi-unit apartment buildings. One of his current projects is the restoration of the famous PIER 39 in San Francisco. Larry's contributions have been recognized with selection as one of the Outstanding Young Men of America in 1985, listed in the WHO's WHO Of American Executives for 1993 and a finalist for Petroleum Engineer of the Year honors for the state of Alaska.

Larry has a B. S. in chemical engineering from LSU and a Masters Degree in Engineering Management from the University of Alaska at Anchorage. He presently serves as Engineering Manager for Fiber Saver Coatings, Inc., in San Diego. He has written several articles on protective coatings for many types of surfaces and uses including wood, masonry and metal applications.

Technical assistance and advice for this article was supplied by William Reckel, an outstanding chemist with over 30 years coating formulation, evaluation and application experience. Mr. Reckel has formulated coatings for projects of many types for uses all over the world. He is currently President of AMTECO, Inc., a high tech coatings manufacturing and consulting corporation.

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September 2, 1997

FSC Fiber Saver Coating, Inc.
5360 Eastgate Mail Road, Suite F
San Diego, Ca. 92121

Dear Cheryl Walczak:

Since we have installed your "Graffiti Max " on our gymnasium our graffiti problem has virtually stopped! I have used this product on other locations and have experienced the same results. I plan to continue using Graffiti Max on up coming building projects. Anyone wanting to protect there building should try this product. Taggers see the shinny coating and just pass it by knowing how easy it is to remove their tags.

Sincerely,
Richard Thompson

Richard Thompson

Building Project Supervisor

707 F STREET • CHULA VISTA, CALIFORNIA 91910 • (619) 691-5027

Post Consumer Recycled Paper

Product Name: Zero Rust

HMIS CODE: H F R P
2 3 0 G

Product Code: Zero Rust 28-60QT-GA_FG, 28-61QT-GA-FG
28-62QT-GA_FG, 28-63QT-GA_FG, 28-67QT-GA-FG, 28-68QT-GA-FG
28-70QT-GA-FG, 28-71QT-GA_FG, 28-72QT-GA_FG, 28-95QT-GA-FG

SECTION I - MANUFACTURER IDENTIFICATION

MANUFACTURER NAME: AMTECO, INC
DISTRIBUTED BY: FSC COATINGS, INC.
5360 EASTGATE MALL ROAD, STE F
SAN DIEGO, CA 92121

EMERGENCY PHONE: 1-800-424-9300
INFORMATION PHONE: 1-800-579-8459
DATE REVISED: 02-05-97

SECTION II - HAZARDOUS INGREDIENTS / SARA III INFORMATION

		OCCUPATIONAL EXPOSURE LIMITS			VAPOR PRESSURE		WEIGHT	
HAZARDOUS COMPONENTS	CAS NUMBER	OSHA PEL	ACGIH TLV	LD50 RATS	mm Hg @	TEMP	PERCENT	LC50 (RAT)
NORMYL BUTYL ACETATE	123-86--4	150 PPM	150 PPM	14 G/KG	8.4	68F	5	633PPM/4H
* METHYL PROPYL KETONE SOLVENT	107-87-9	200PPM	200PPM	3.7 G/KG	27.8	68F	8	200 PPM 4H
* SOLVENT NAPTHA (PETROLEUM) LIGHT AROMATIC	64742-95-6	200 PPM	200PPM	4.7 G/KG	12.4	230I	18	3670PPM
MAGNESIUM SILICATE HYDRATE	14807-96-6	----------	2 MG/M3	----------		N/A	25	----------
XYLOL / XYLENE	1330-20-7	100PPM	100PPM	4.30 G/KG	9.5	406F	2	6700PPM/4H

* INDICATES TOXIC CHEMICAL(S) SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF TITLE III AND OF 40 CFR 372.
XYLENE - SKIN DESIGNATION - CANADA WHMIS
THIS PRODUCT IS PHOTOCHEMICALLY REACTIVE PURSUANT TO SCAQMD RULE 102

SECTION III - -PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT: 300 DEG F
SPECIFIC GRAVITY (H20=1): 1.3
VAPOR DENSITY: HEAVIER THAN AIR
EVAPERATION RATE: SLOWER THAN ETHER
COATING V.O.C. : 3.34 LB/GL (400 G/L)
ODOUR THRESHOLD: N/D
MATERIAL V.O.C. : 3.34 LB/GL (400 G/L)
VAPOR PRESSURE: 8.4 @ 68 F
SOLUBILITY IN WATER : NON SOLUBLE
COEFFICIENT OF H20/OIL DISTRIBUTION; LESS THAN 1%
APPEARANCE AND ODOR: LIQUID WITH KETONE ODOR

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 68 DEG F (168 Deg F/TOC) METHOD USE: TCC
AMMABLE LIMITS IN AIR BY VOLUME - LOWER: 1.1% UPPER 7.6%
TINGUISHING MEDIA: FOAM, CO2, DRY CHEMICAL, WATER FOG
SPECIAL FIREFIGHTING PROCEDURES
ALL FIREFIGHTING PERSONNEL SHOULD BE WEARING FULL PROTECTIVE EQUIPMENT INCLUDING SELF CONTAINED BREATHING APPARATUS. WATER MAY BE INEFFECTIVE BUT SHOULD BE USED TO COOL EXPOSED CONTAINERS.

UNUSUAL FIRE AND EXPLOSION HAZARDS
KEEP CONTAINERS TIGHTLY CLOSED. ISOLATE FROM HEAT, ELECTRICAL EQUIPMENT, SPARKS , AND OPEN FLAME. CLOSED CONTAINERS MAY EXPLODE WHEN EXPOSED TO EXTREME HEAT. COMBUSTIBLE MATERIALS CONTAMINATED WITH OVERSPRAY OR LIQUID RESIDUES OF THIS PRODUCT MAY UNDERGO SPONTANEOUS COMBUSTION. MECHANICAL IMPACT SENSITIVITY-NONE. STATIC DISCHARGE SENSITIVITY-UNKNOWN.

SECTION V - REACTIVITY DATA

STABILITY: STABLE
CONDITIONS TO AVOID
EXTREME HEAT

INCOMPATIBILITY (MATERIALS TO AVOID)
NITRATES, STRONG OXIDIZING AGENTS, STRONG ACIDS

HAZARDOUS DECOMPOSITION OR BYPRODUCTS
NONE-HAZARDOUS COMBUSTION PRODUCTS : CARBON MONOXIDE, SMOKE, OXIDES OF NITROGEN
HAZARDOUS POLYMERIZATION: WILL NOT OCCUR
NONE

SECTION VI - HEALTH HAZARD DATA

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE, POSSIBLE UNCONSCIOUSNESS AND EVEN ASPHYXIATION.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
M CAUSE SEVERE IRRITATION, REDNESS, TEARING, BLURRED VISION, AND A SENSATION OF SEEING HALOS AROUND LIGHTS.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY LEAD TO EXTRACTION OF NATURAL OILS WITH RESULTANT MILD IRRITATION INCLUDING REDNESS, DRYNESS AND ITCHING
INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, AND DIARRHEA. ASPIRATION OF MATERIAL INTO THE LUNGS CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.

HEALTH HAZARDS (ACUTE AND CHRONIC)
IRONIC EXPOSURE MAY CAUSE LIVER AND KIDNEY DAMAGE OVEREXPOSURE MAY HAVE THE FOLLOWING
FECT: CARDIAC ABNORMALITIES. THIS PRODUCT CONTAINS A CHEMICAL WHICH IS KNOWN TO BE A SKIN IRRITANT. SENSITIZATION TO SKIN. TERATOGEN-YES (XYLENE) REPRODUCTIVE TOXICITY-NONE MUTAGENCITY-NONE SYNERFISTIC PRODUCTS-NONE

CARCINOGENICITY: NTP? NO IARC MONOGRAPHS? NO OSHA REGULATED? NO

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: NOT KNOWN

EMERGENCY AND FIRST AID PROCEDURES
INHALATION; MOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NECESSARY.
SKIN CONTACT; WASH WITH SOAP & WATER.
EYE CONTACT; FLUSH WITH WATER FOR AT LEAST 15 MINUTES, CONSULT PHYSICIAN.
INGESTION; DRINK 1-2 GLASSES OF WATER TO DILUTE. DO NOT INDUCE VOMITING. CONSULT PHYSICIAN IMMEDIATELY.

========== SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE ==========

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
REMOVE ALL SOURCES OF IGNITION. AVOID BREATHING VAPORS, VENTILATE AREA. REMOVE WITH INERT MATERIAL.

WASTE DISPOSAL METHOD
INCINERATE IN APPROVED FACILITY. DO NOT INCINERATE CLOSED CONTAINERS. DISPOSE OF ACCORDING TO FEDERAL, STATE AND LOCAL POLLUTION CONTROL REQUIREMENTS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAMES, CLOSE CONTAINERS AFTER EACH USE.

OTHER PRECAUTIONS
DO NOT TAKE INTERNALLY.
THIS MATERIAL IS DESIGNED FOR APPLICATION ONLY BY PROFESSIONAL TRAINED PERSONNEL USING PROPER EQUIPMENT UNDER CONTROLLED CONDITIONS.

========== SECTION VIII - CONTROL MEASURES ==========

PIRATORY PROTECTION
USE WITH ADEQUATE VENTILATION. OVEREXPOSURE TO VAPORS MAY BE PREVENTED BY ENSURING VENTILATION CONTROLS, VAPOR EXHAUST OR FRESH AIR ENTRY. NIOSH MSHA APPROVED (TC - 23C) AIR PURIFYING OR AIR SUPPLIED (TC-19 C) RESPIRATORS MAY ALSO REDUCE EXPOSURE.
VENTILATION
PROVIDE SUFFICIENT VENTILATION TO KEEP VAPORS CONCENTRATION BELOW GIVEN TLV AND LEL LEVELS. IF LOCAL EXHAUST DOES NOT KEEP VAPOR CONCENTRATION BELOW LISTED LEVELS MECHANICAL EXHAUST IS REQUIRED.

PROTECTIVE GLOVES
IMPERMEABLE CHEMICAL RESISTANT GLOVES SUCH AS NEOPRENE COATED GLOVES.

EYE PROTECTION
USE SAFETY EYEWARE WITH SIDESHIELDS TO PROTECT AGAINST CHEMICAL SPLASH OF LIQUIDS.
OTHER PROTECTIVE CLOTHING OR EQUIPMENT
EYE BATH AND SHOWERS SHOULD BE AVAILABLE. USE CHEMICAL RESISTANT APRON, BOOTS OR OTHER CLOTHING IF NEEDED TO AVOID REPEATED OR FREQUENT SKIN CONTACT. LIQUID MAY PENETRATE SHOES AND LEATHER CAUSING DELAYED IRRITATION.

WORK/HYGIENIC PRACTICES
WASH HANDS BEFORE EATING, SMOKING OR USING WASHROOM.

========== SECTION IX - DISCLAIMER ==========

DISCLAIMER
TO THE BEST OF OUR KNOWLEDGE, THE INFORMATION CONTAINED HEREIN IS ACCURATE. HOWEVER, AMTECO, INC. DOES NOT ASSUME ANY LIABILITY WHATSOEVER FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION CONTAINED HEREIN. FINAL DETERMINATION OF SUITABILITY OF ANY MATERIAL IS THE SOLE RESPONSIBILITY OF THE USER.

28-62 (@ 275 g/l)
08/31/98

M A T E R I A L S A F E T Y D A T A S H E E T

PRODUCT NAME: BLACK ZERO RUST PRIMER 275 g/l VOC
PRODUCT CODE: 28-62 (@ 275 g/l)

HMIS CODES: H F R P
2 3 0 G

========== SECTION I - MANUFACTURER IDENTIFICATION ==========

MANUFACTURER'S NAME: AMTECO, INC., PACIFIC, MO
TECHNICAL INFORMATION: FSC COATINGS, INC.
5360 EASTGATE MALL ROAD, STE. F
SAN DIEGO, CA 92121
EMERGENCY PHONE: 800-424-9300
INFORMATION PHONE: 619-558-0800
DATE PRINTED: 08/31/98
NAME OF PREPARER: N/A

========== SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION ==========

REPORTABLE COMPONENTS	CAS NUMBER	WEIGHT PERCENT
* TETRACHLOROETHYLENE OSHA PEL: 100PPM, ACGIH TLV: 100PPM	127-18-4	12.07
2-PROPANONE OSHA PEL: 750 PPM TWA 1000 PPM STEL ACGIH TLV:750 PPM TWA 1000 PPM STEL	67-64-1	10
TCC OSHA PEL: N/A, ACGIH TLV: N/A, OTHER: N/A	98-56-6	5
SOLVENT NAPTHA (PETROLEUM) HEAVY AROMATIC OSHA PEL: 25 PPM TWA 15 PPM STEL ACGIH TLV:25 PPM TWA 15 PPM STEL	64742-94-5	5

* Indicates toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372.
PAINT, 3, UN 1263, PG.II EMG GUIDE #127

========== SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS ==========

BOILING RANGE: 133 F - 355-420 F
VAPOR DENSITY: HEAVIER THAN AIR
COATING V.O.C.: 2.25 lb/gl
SOLUBILITY IN WATER: INSOLUBLE
SPECIFIC GRAVITY (H2O=1): 1.36
EVAPORATION RATE: SLOWER THAN ETHER
MATERIAL V.O.C.: 1.67 lb/gl
APPEARANCE AND ODOR: BLACK LIQUID MILD SOLVENT ODOR

========== SECTION IV - FIRE AND EXPLOSION HAZARD DATA ==========

FLASH POINT: 35 F
METHOD USED: TCC
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 0.9 UPPER: 12.8

EXTINGUISHING MEDIA: FOAM, CO2, DRY CHEMICAL, WATER FOG

SPECIAL FIREFIGHTING PROCEDURES
WEAR A SELF-CONTINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN THE POSITIVE PRESSURE DEMAND MODE WITH APPROPRIATE TURN-OUT GEAR AND CHEMICAL RESISTANT PERSONAL PROTECTIVE EQUIPMENT.

UNUSUAL FIRE AND EXPLOSION HAZARDS
WATER MAY BE USED TO COOL CONTAINERS. VAPORS MAY CAUSE FLASH FIRES. KEEP

CONTAINERS TIGHTLY CLOSED AND ISOLATE FROM HEAT, SPARKS AND FLAME. NEVER USE WELDING OR CUTTING TORCH ON OR NEAR CONTAINERS EVER IF EMPTY. RESIDUE CAN STILL IGNITE.

========== SECTION V - REACTIVITY DATA ==========

STABILITY: STABLE
CONDITIONS TO AVOID
AVOID CONTACT WITH STRONG OXIDIZERS, HIGH TEMPERATURES AND OPEN IGNITION SOURCES.

INCOMPATIBILITY (MATERIALS TO AVOID)
OXIDIZING AGENTS

HAZARDOUS DECOMPOSITION OR BYPRODUCTS
CARBON DIOXIDE, CARBON MONOXIDE, OXIDES OF NITROGEN

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

========== SECTION VI - HEALTH HAZARD DATA ==========

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
INHALATION OF VAPOR OR MIST CAN CAUSE HE FOLLOWING:
IRRITATION TO THE UPPER RESPIRATORY TRACT, MAY CAUSE NAUSEA, HEADACHE, FATIGUE, LOSS OF APPETITE. HIGH CONCENTRATIONS CAN CAUSE COLLAPSE, BRONCHITIS, PNEUMONIA AND CONVULSIONS.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
SKIN: CAN CAUSE IRRITATION. CAN CAUSE DEFATTING OF SKIN, WHICH CAN LEAD TO DERMITITIS.
EYE: LIQUID AND VAPOR CAN BE IRRITATING TO EYES. SYMPTOMS INCLUDE TEARING, REDNESS AND DISCOMFORT.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
THIS PRODUCT IS NOT EASILY ABSORBED. PROLONGED CONTACT MAY RESULT IN THE EXTRACTION OF NATURAL OILS CAUSING IRRITATION AND DRYNESS.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
TOXIC IF SWALLOWED. WILL CAUSE VOMITING, NAUSEA, DIARRHEA. HIGH CONCENTRATRTIONS CAN CAUSE COLLAPSE, PNEUMOLNIAAND CONVULSIONS.

HEALTH HAZARDS (ACUTE AND CHRONIC)
BREATHING DIFFICULTIES, DIZZINESS, LOSS OF COORDINATION AND HEADACHE ARE SIGNS OF EXPOSURE TO CONSENTRATIONS ABOVE THE TLV.
REPORTS HAVE ASSOCIATED REPEATED AND PROLONGED OCCUPATIONAL OVEREXPOSURE WITH PERMANENT BRAIN AND NERVOUS SYSTEM DAMAGE.
INTENTIONAL MISUSE BY DELIBERATELY CONCENTRATING AND INHALING THE CONTENTS MAY BE HARMFUL OR FATAL.

CARCINOGENICITY: NTP CARCINOGEN: N/A IARC MONOGRAPHS: Yes OSHA REGULATED: N/A
N/A

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
PRE-EXISTING DISORDERS OR DISEASES OF THE SKIN, EYE, LIVER, KIDNEY, NERVOUS SYSTEM, RESPIRATORY AND/OR PULMONARY SYSTEM, LUNG(E.G. ASTHMA-LIKE CONDISITONS).

EMERGENCY AND FIRST AID PROCEDURES
INHALATION: MOVE SUBJECT TO FRESH AIR. RESTORE BREATHING IF NECESSARY. TREAT SYMPTOMATICALLY AND CONSULT PHYSICIAN. EYE & SKIN CONTACT:FLUSH EYES WITH LARGE

AMOUNT OF WATER FOR ATLEAST 15 MINUTES. SEE A PHYSICIAN IMMEDIATELY. WASH SKIN AFTER REMOVING CONTAMINATED CLOTHING WITH MILD SOAP AND WATER FOR 15 MINUTES. SEE PHYSICIAN IF IRRITATION PERSISTS. INGESTION: DRINK 1-2 GLASSES OF WATER TO DILUTE. DO NOT INDUCE VOMITING. CONSULT A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY. TREAT SYMPTOMATICALLY. NEVER GIVE LIQUIDS TO AN UNCONSCIOUS PERSON.

========== SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE ==========

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
STOP SPILL AT SOURCE. ELIMINATE ALL IGNITION SOURCES(FLARES, OPEN FLAMES, PILOT LIGHTS, ELECTRICAL SPARKS). USE ONLY NON SPARKING TOOLS FOR CLEAN UP. SUPPLY ADEQUATE VENTILATION. AVOID BREATHING OF VAPORS. USE RESPIRATOR. CONTAIN AND REMOVE WITH INERT ABSORBENT.

WASTE DISPOSAL METHOD
DISPOSE OF ACCORDING TO FEDERAL, STATE AND LOCAL REGULATIONS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
KEEP ALL CONTAINERS TIGHT AND IN AN UPRIGHT POSITION TO PREVENT LEAKS. STORE CONTAINERS OUT OF SUN AND AWAY FROM ALL HEAT SOURCES. THIS MATERIAL SHOULD BE GROUNDED WHEN POURING. DO NOT STORE NEAR HEAT, SPARKS OR OPEN FLAME.

OTHER PRECAUTIONS
DO NOT TAKE INTERNALLY.

========== SECTION VIII - CONTROL MEASURES ==========

RESPIRATORY PROTECTION
DO NOT BREATHE VAPORS OR SPRAY MIST. WEAR AN APPROPRIATE, PROPERLY FITTED RESPIRATOR (NIOSH/MSHA APPROVED) DURING APPLICATION AND OTHER USE OF THIS MATERIAL UNTIL VAPORS AND MISTS ARE EXHAUSTED AND EXPOSURE IS BELOW LISTED TLV(S). USE APPROVED CHEMICAL/CECHANICAL FILTERS DESIGNED TO REMOVE A COMBINATION OF PARTICLES AND VAPORS.

VENTILATION
PROVIDE SUFFICIENT VENTILATION TO KEEP VAPOR CONCENTRATIONS BELOW GIVEN TLV AND LEL LEVELS. IF LOCAL EXHAUST DOES NOT DEEP VAPOR CONCENTRATIONS BELOW LISTED LEVELS MECHANICAL EXHAUSE IS REQUIRED.

PROTECTIVE GLOVES
IMPERMEABLE CHEMICAL RESISTANT GLOVES SUCH AS NEOPRENE COATED GLOVES.

EYE PROTECTION
USE SAFETY EYEWARE WITH SIDESHIELDS TO PROTECT AGAINST CHEMICAL SPLASH OF LIQUIDS.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT
EYE BATH AND SHOWERS SHOULD BE READILY AVAILABLE. USE CHEMICAL REISTANT APRON, BOOTS OR OTHER CLOTHING NEEDED TO AVOID REPEATED OR FREQUENT SKING CONTACT. LIQUID MAY PENETRATE SHOES AND LEATHER CAUSING DELAYED IRRITATION.

WORK/HYGIENIC PRACTICES
WASH HANDS BEFORE AND AFTER EATING, SMOKING AND USING THE BATHROOM.

========== SECTION IX - DISCLAIMER ==========

TO THE BEST OF OUR KNOWLEDGE, THE INFORMATION CONTAINED HEREIN IS ACCURATE. HOWEVER, AMTECO, INC. DOES NOT ASSUME ANY LIABILITY WHATSOEVER FOR THE ACCURACY OF COMPLETENESS OF THE INFORMATION CONTAINED HEREIN. FINAL DETERMINATION OF

SUITABILITY OF ANY MATERIAL IS THE SOLE RESPONSIBILITY OF THE USER.

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: SILICONE POLY PLUS CLEAR DEEP TINT **HMIS CODES:** H F R P
PRODUCT CODE: SA-3 2 2 0 G

SECTION I -- MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME:	AMTECO, INC.,		
TECHNICAL INFORMATION:	FIBER SAVER COATINGS, Inc., 5360 EASTGATE MALL, STE #F, SAN DIEGO, CA 92121		
EMERGENCY PHONE:	800-424-9300	DATE REVISED:	01-08-98
INFORMATION PHONE:	858-558-0800	NAME OF PREPARER:	N/A
DOT CLASSIFICATION:	COMBUSTIBLE LIQUID, NOS NA 1993, PG III ERG GUIDE 128		

SECTION II -- HAZARDOUS INGREDIENTS / SARA III INFORMATION

HAZARDOUS COMPONENTS	CAS NUMBER	OCCUPATIONAL EXPOSURE LIMITS OSHA PEL	ACGIN TLV	LDSO RATS	VAPOR PRESSURE mm HG @	TEMP	WEIGHT PERCENT
*XYLOL / XYLENE	1330-20-7	100PPM	100PPM	4.30 G/KG	9.5	106°F	1
*SOLVENT NAPTHA (PETROLEUM) LIGHT AROMATIC	64742-95-6	200PPM	200PPM	4.7 G/KG	12.4	230°F	7
*COBALT DRIER 12%	7440-048-4	0.1 mg/m3	0.1mg/m3	>25ml/kg	2.7	68°F	0.15

*Indicates toxic chemical(s) subject to the reporting requirements of Section 313 of Title III and of 40 CFR 372.

SECTION III PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING RANGE: 248 to 300 Deg F
SPECIFIC GRAVITY (H20=1): .955
VAPOR DENSITY: HEAVIER THAN AIR
EVAPORATION RATE: SLOWER THAN ETHER
COATING V.O.C. : 2.89 LB /GL (347 G/L)
MATERIAL V.O.C.: 2.89 LB/GL (347 G/L)
SOLUBILITY IN WATER: NON SOLUBLE
APPEARANCE AND ODOR: CLEAR LIQUID, MILD SOLVENT ODOR

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 82 Deg F
METHOD USED: TCC.
FLAMMABLE LIMITS IN AIR BY VOLUME-- LOWER: 1.0% UPPER: 6.6%

EXTINGUISHING MEDIA: FOAM, C02, DRY CHEMICAL

SPECIAL FIREFIGHTING PROCEDURES:
ALL FIRIFIGHTING PPERSONNEL SHOULD BE WEARING FULL PROTECTIVE EQUIPMENT INCLUDING SELF CONTAINED BREATHING APPARATUS. WATER SHOULD BE USED TO COOL EXPOSED CONTAINERS.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
KEEP CONTAINERS TIGHTLY CLOSED. ISOLATE FROM HEAT, ELECTRICAL EQUIPMENT, SPARKS, AND OPEN FLAME. CLOSED CONTAINERS MAY EXPLODE WHEN EXPOSED TO EXTREME HEAT.

========== SECTION V REACTIVITY DATA ==========

STABILITY: STABLE
CONDITIONS TO AVOID:
EXTREME HEAT

INCOMPATIBILITY (MATERIALS TO AVOID):
NONE REASONABLY FORESEEABLE

HAZARDOUS DECOMPOSITION OR BYPRODUCTS:
CARBON MONOXIDE, CARBON DIOXIDE, SKOKE, OXIDES OF NITROGEN

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR
NONE

==========SECTION VI HEALTH HAZARD DATA==========

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE, POSSIBLE UNCONSCIOUSNESS AND EVEN ASPHYXIATION.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY CAUSE SEVERE IRRITATION, REDNESS, TEARING, BLURRED VISION, AND A SENSATION OF SEEING HALOS AROUND LIGHTS.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY LEAD TO EXTRACTION OF NATURAL OILS WITH RESULTANT MILD IRRITATION.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, AND DIARRHEA. ASPIRATION OF MATERIAL INTO THE LUNGS CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.

HEALTH HAZARDS (ACUTE AND CHRONIC)
CHRONIC EXPOSURE MAY CAUSE LIVER AID KIDNEY DAMAGE. OVEREXPOSURE MAY HAVE THE FOLLOWNG EFFECT: CARDIAC ABNORMALITIES

CARCINOGENICITY: NTP? NO IARC MONOGRAPHS? YES OSHA REGULATED? NO
NONE

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NOT KNOWN

EMERGENCY AND FIRST AID PROCEDURE
INHALATION: MOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NECESSARY.
SKIN CONTACT: WASH WITH SOAP & WATER.
EYE CONTACT: FLUSH WITH WATER FOR AT LEAST 15 MINUTES. CONSULT PHYSICIAN.
INGESTION: DRINK 1-2 GLASSES OF WATER TO DILUTE. DO NOT INDUCE VOMITING. CONSULT PHYSICIAN IMMEDIATELY

========== SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE ==========

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
REMOVE ALL SOURCES OF IGNITION. AVOID BREATING VAPORS. VENTILATE AREA. REMOVE WITH INERT MATERIAL.

WASTE DISPOSAL METHOD
INCINERATE IN APPROVED FACILITY. DO NOT INCINERATE CLOSED CONTAINERS. DISPOSE OF ACCORDING TO FEDERAL, STATE, AND LOCAL POLLUTION CONTROL REQUIREMENTS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAMES. CLOSE CONTAINERS AFTER EACH USE.

OTHER PRECAUTIONS
DO NOT TAKE INTERNALLY

========== SECTION VIII CONTROL MEASURES ==========

RESPIRATORY PROTECTION
ADEQUATE VENTILATION IS REQUIRED. USE NIOSH/MSHA APPROVED RESPIRATOR DEVICE.

VENTILATION
PROVIDE SUFFICIENT VENTILATION TO KEEP VAPORS CONCENTRATION BELOW GIVEN TLV AND LEL LEVELS.

PROTECTIVE GLOVES
REQUIRED FOR PROLONGED OR REPEATED CONTACT.

EYE PROTECTION
USE SAFETY EYEWEAR DESIGNED TO PROTECT AGAINST SPLASH OF LIQUIDS.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT
EYE BATH AND SHOWERS SHOULD BE AVAILABLE. USE CHEMICAL RESISTANT APRON, BOOTS OR OTHER CLOTHING IF NEEDED TO AVOID REPEATED OR FREQUENT SKIN CONTACT. LIQUID MAY PENETRATE SHOES AND LEATHER CAUSING DELAYED IRRITATION.

WORK/HYGIENIC PRACTICES

========== SECTION IX DISCLAIMER ==========

DISCLAIMER
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AWR2SALVOC
06/18/99

M A T E R I A L S A F E T Y D A T A S H E E T

PRODUCT NAME: VOC SATIN ACRYLIC LACQUER
PRODUCT CODE: AWR2SALVOC

HMIS CODES: H F R
2 3 0

========== SECTION I - MANUFACTURER IDENTIFICATION ==========

MANUFACTURER'S NAME: AMTECO, INC., PACIFIC, MO
TECHNICAL INFORMATION: FSC COATINGS, INC.
5360 EASTGATE MALL ROAD, STE. F
SAN DIEGO, CA 92121
EMERGENCY PHONE: 800-424-9300
INFORMATION PHONE: 619-558-0800

DATE PRINTED: 06/18/99
NAME OF PREPARER: N/A

========== SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION ==========

REPORTABLE COMPONENTS	CAS NUMBER	WEIGHT PERCENT
SOLVENT NAPHTHA(PETROLEUM) LIGHT AROMATIC OSHA PEL: 200PPM, ACGIH TLV: 200PPM	6474-95-6	50
* TETRACHLOROETHYLENE OSHA PEL: 100PPM, ACGIH TLV: 100PPM	127-18-4	17.71
2-PROPANONE OSHA PEL: 750 PPM TWA 1000 PPM STEL ACGIH TLV:750 PPM TWA 1000 PPM STEL	67-64-1	10

* Indicates toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372.
PAINT, 3, UN 1263, PG.II EMG GUIDE #127

========== SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS ==========

BOILING RANGE: 133 F - 300-355 F
VAPOR DENSITY: HEAVIER THAN AIR
COATING V.O.C.: 5.63 lb/gl
SOLUBILITY IN WATER: INSOLUBLE
SPECIFIC GRAVITY (H2O=1): 1.03
EVAPORATION RATE: SLOWER THAN ETHER
MATERIAL V.O.C.: 4.31 lb/gl
APPEARANCE AND ODOR: CLEAR LIQUID STRONG SOLVENT ODOR

========== SECTION IV - FIRE AND EXPLOSION HAZARD DATA ==========

FLASH POINT: 35 F METHOD USED: TCC
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 1 UPPER: 12.8

EXTINGUISHING MEDIA: FOAM, CO2, DRY CHEMICAL, WATER FOG

SPECIAL FIREFIGHTING PROCEDURES
WEAR A SELF-CONTINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN THE POSITIVE PRESSURE DEMAND MODE WITH APPROPRIATE TURN-OUT GEAR AND CHEMICAL RESISTANT PERSONAL PROTECTIVE EQUIPMENT.

UNUSUAL FIRE AND EXPLOSION HAZARDS
WATER MAY BE USED TO COOL CONTAINERS. VAPORS MAY CAUSE FLASH FIRES. KEEP CONTAINERS TIGHTLY CLOSED AND ISOLATE FROM HEAT, SPARKS AND FLAME. NEVER USE WELDING OR CUTTING TORCH ON OR NEAR CONTAINERS EVER IF EMPTY. RESIDUE CAN STILL IGNITE.

========== SECTION V - REACTIVITY DATA ==========

STABILITY: STABLE
CONDITIONS TO AVOID
AVOID CONTACT WITH STRONG OXIDIZERS, HIGH TEMPERATURES AND OPEN IGNITION SOURCES.

INCOMPATIBILITY (MATERIALS TO AVOID)
OXIDIZING AGENTS

HAZARDOUS DECOMPOSITION OR BYPRODUCTS
CARBON DIOXIDE, CARBON MONOXIDE, OXIDES OF NITROGEN

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

========== SECTION VI - HEALTH HAZARD DATA ==========

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
INHALATION OF VAPOR OR MIST CAN CAUSE HE FOLLOWING:
IRRITATION TO THE UPPER RESPIRATORY TRACT, MAY CAUSE NAUSEA, HEADACHE, FATIGUE, LOSS OF APPETITE. HIGH CONCENTRATIONS CAN CAUSE COLLAPSE, BRONCHITIS, PNEUMONIA AND CONVULSIONS.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
SKIN: CAN CAUSE IRRITATION. CAN CAUSE DEFATTING OF SKIN, WHICH CAN LEAD TO DERMITITIS.
EYE: LIQUID AND VAPOR CAN BE IRRITATING TO EYES. SYMPTOMS INCLUDE TEARING, REDNESS AND DISCOMFORT.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
THIS PRODUCT IS NOT EASILY ABSORBED. PROLONGED CONTACT MAY RESULT IN THE EXTRACTION OF NATURAL OILS CAUSING IRRITATION AND DRYNESS.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
TOXIC IF SWALLOWED. WILL CAUSE VOMITING, NAUSEA, DIARRHEA. HIGH CONCENTRATRTIONS CAN CAUSE COLLAPSE, PNEUMOLNIAAND CONVULSIONS.

HEALTH HAZARDS (ACUTE AND CHRONIC)
BREATHING DIFFICULTIES, DIZZINESS, LOSS OF COORDINATION AND HEADACHE ARE SIGNS OF EXPOSURE TO CONSENTRATIONS ABOVE THE TLV.
REPORTS HAVE ASSOCIATED REPEATED AND PROLONGED OCCUPATIONAL OVEREXPOSURE WITH PERMANENT BRAIN AND NERVOUS SYSTEM DAMAGE.
INTENTIONAL MISUSE BY DELIBERATELY CONCENTRATING AND INHALING THE CONTENTS MAY BE HARMFUL OR FATAL.

CARCINOGENICITY: NTP CARCINOGEN: N/A IARC MONOGRAPHS: Yes OSHA REGULATED: N/A
N/A

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
PRE-EXISTING DISORDERS OR DISEASES OF THE SKIN, EYE, LIVER, KIDNEY, NERVOUS SYSTEM, RESPIRATORY AND/OR PULMONARY SYSTEM, LUNG(E.G. ASTHMA-LIKE CONDISITONS).

EMERGENCY AND FIRST AID PROCEDURES
INHALATION: MOVE SUBJECT TO FRESH AIR. RESTORE BREATHING IF NECESSARY. TREAT SYMPTOMATICALLY AND CONSULT PHYSICIAN. EYE & SKIN CONTACT:FLUSH EYES WITH LARGE AMOUNT OF WATER FOR ATLEAST 15 MINUTES. SEE A PHYSICIAN IMMEDIATELY. WASH SKIN AFTER REMOVING CONTAMINATED CLOTHING WITH MILD SOAP AND WATER FOR 15 MINUTES. SEE PHYSICIAN IF IRRITATION PERSISTS. INGESTION: DRINK 1-2 GLASSES OF WATER TO

DILUTE. DO NOT INDUCE VOMITING. CONSULT A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY. TREAT SYMPTOMATICALLY. NEVER GIVE LIQUIDS TO AN UNCONSCIOUS PERSON.

========== SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE ==========

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
STOP SPILL AT SOURCE. ELIMINATE ALL IGNITION SOURCES(FLARES, OPEN FLAMES, PILOT LIGHTS, ELECTRICAL SPARKS). USE ONLY NON SPARKING TOOLS FOR CLEAN UP. SUPPLY ADEQUATE VENTILATION. AVOID BREATHING OF VAPORS, USE RESPIRATOR. CONTAIN AND REMOVE WITH INERT ABSORBENT.

WASTE DISPOSAL METHOD
DISPOSE OF ACCORDING TO FEDERAL, STATE AND LOCAL REGULATIONS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
KEEP ALL CONTAINERS TIGHT AND IN AN UPRIGHT POSITION TO PREVENT LEAKS. STORE CONTAINERS OUT OF SUN AND AWAY FROM ALL HEAT SOURCES. THIS MATERIAL SHOULD BE GROUNDED WHEN POURING. DO NOT STORE NEAR HEAT, SPARKS OR OPEN FLAME.

OTHER PRECAUTIONS
DO NOT TAKE INTERNALLY.

========== SECTION VIII - CONTROL MEASURES ==========

RESPIRATORY PROTECTION
DO NOT BREATHE VAPORS OR SPRAY MIST. WEAR AN APPROPRIATE, PROPERLY FITTED RESPIRATOR (NIOSH/MSHA APPROVED) DURING APPLICATION AND OTHER USE OF THIS MATERIAL UNTIL VAPORS AND MISTS ARE EXHAUSTED AND EXPOSURE IS BELOW LISTED V(S). USE APPROVED CHEMICAL/CECHANICAL FILTERS DESIGNED TO REMOVE A MBINATION OF PARTICLES AND VAPORS.

VENTILATION
PROVIDE SUFFICIENT VENTILATION TO KEEP VAPOR CONCENTRATIONS BELOW GIVEN TLV AND LEL LEVELS. IF LOCAL EXHAUST DOES NOT DEEP VAPOR CONCENTRATIONS BELOW LISTED LEVELS MECHANICAL EXHAUSE IS REQUIRED.

PROTECTIVE GLOVES
IMPERMEABLE CHEMICAL RESISTANT GLOVES SUCH AS NEOPRENE COATED GLOVES.

EYE PROTECTION
USE SAFETY EYEWARE WITH SIDESHIELDS TO PROTECT AGAINST CHEMICAL SPLASH OF LIQUIDS.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT
EYE BATH AND SHOWERS SHOULD BE READILY AVAILABLE. USE CHEMICAL REISTANT APRON, BOOTS OR OTHER CLOTHING NEEDED TO AVOID REPEATED OR FREQUENT SKING CONTACT. LIQUID MAY PENETRATE SHOES AND LEATHER CAUSING DELAYED IRRITATION.

WORK/HYGIENIC PRACTICES
WASH HANDS BEFORE AND AFTER EATING, SMOKING AND USING THE BATHROOM.

========== SECTION IX - DISCLAIMER ==========

TO THE BEST OF OUR KNOWLEDGE, THE INFORMATION CONTAINED HEREIN IS ACCURATE. EVER, AMTECO, INC. DOES NOT ASSUME ANY LIABILITY WHATSOEVER FOR THE ACCURACY OF COMPLETENESS OF THE INFORMATION CONTAINED HEREIN. FINAL DETERMINATION OF SUITABILITY OF ANY MATERIAL IS THE SOLE RESPONSIBILITY OF THE USER.

102-22
10/01/99

M A T E R I A L S A F E T Y D A T A S H E E T

PRODUCT NAME: HIGH SOLIDS QD VARNISH
PRODUCT CODE: 102-22

HMIS CODES: H F R P
2 3 0 G

SECTION I - MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME:	AMTECO, INC., PACIFIC, MO
TECHNICAL INFORMATION:	FSC COATINGS, INC.
	5360 EASTGATE MALL ROAD, STE. F, San Diego CA 92121
EMERGENCY PHONE:	800-424-9300
INFORMATION PHONE:	858-558-0800

DATE PRINTED: 10/01/99
NAME OF PREPARER: N/A

SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION

REPORTABLE COMPONENTS	CAS NUMBER	WEIGHT PERCENT
SOLVENT NAPHTHA(PETROLEUM), LIGHT ALIPHATIC OSHA PEL: 500PPM, ACGIH TLV: 300PPM	64742-89-8	30
SOLVENT NAPTHA (PETROLEUM) MEDIUM ALIPHATIC OSHA PEL: 500PPM, ACGIH TLV: 100PPM	64742-88-7	20

N/A
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SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING RANGE: 247-282 F - 324-402 F
VAPOR DENSITY: HEAVIER THAN AIR
COATING V.O.C.: 3.62 lb/gl
SOLUBILITY IN WATER: INSOLUBLE
APPEARANCE AND ODOR:

SPECIFIC GRAVITY (H2O=1): 0.87
EVAPORATION RATE: SLOWER THAN ETHER
MATERIAL V.O.C.: 3.62 lb/gl

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 55 METHOD USED: TCC
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 1 UPPER: 7

EXTINGUISHING MEDIA: FOAM, CO2, DRY CHEMICAL, WATER FOG

SPECIAL FIREFIGHTING PROCEDURES
WEAR A SELF-CONTINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN THE POSITIVE PRESSURE DEMAND MODE WITH APPROPRIATE TURN-OUT GEAR AND CHEMICAL RESISTANT PERSONAL PROTECTIVE EQUIPMENT.

UNUSUAL FIRE AND EXPLOSION HAZARDS
WATER MAY BE USED TO COOL CONTAINERS. VAPORS MAY CAUSE FLASH FIRES. KEEP CONTAINERS TIGHTLY CLOSED AND ISOLATE FROM HEAT, SPARKS AND FLAME. NEVER USE WELDING OR CUTTING TORCH ON OR NEAR CONTAINERS EVER IF EMPTY. RESIDUE CAN STILL IGNITE.

SECTION V - REACTIVITY DATA

STABILITY: STABLE

CONDITIONS TO AVOID
AVOID CONTACT WITH STRONG OXIDIZERS, HIGH TEMPERATURES AND OPEN IGNITION SOURCES.

INCOMPATIBILITY (MATERIALS TO AVOID)
OXIDIZING AGENTS

HAZARDOUS DECOMPOSITION OR BYPRODUCTS
CARBON DIOXIDE, CARBON MONOXIDE, OXIDES OF NITROGEN

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

========== SECTION VI - HEALTH HAZARD DATA ==========

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
INHALATION OF VAPOR OR MIST CAN CAUSE HE FOLLOWING:
IRRITATION TO THE UPPER RESPIRATORY TRACT, MAY CAUSE NAUSEA, HEADACHE, FATIGUE, LOSS OF APPETITE. HIGH CONCENTRATIONS CAN CAUSE COLLAPSE, BRONCHITIS, PNEUMONIA AND CONVULSIONS.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
SKIN: CAN CAUSE IRRITATION. CAN CAUSE DEFATTING OF SKIN, WHICH CAN LEAD TO DERMITITIS.
EYE: LIQUID AND VAPOR CAN BE IRRITATING TO EYES. SYMPTOMS INCLUDE TEARING, REDNESS AND DISCOMFORT.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
THIS PRODUCT IS NOT EASILY ABSORBED. PROLONGED CONTACT MAY RESULT IN THE EXTRACTION OF NATURAL OILS CAUSING IRRITATION AND DRYNESS.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
TOXIC IF SWALLOWED. WILL CAUSE VOMITING, NAUSEA, DIARRHEA. HIGH CONCENTRATRTIONS CAN CAUSE COLLAPSE, PNEUMOLNIAAND CONVULSIONS.

HEALTH HAZARDS (ACUTE AND CHRONIC)
BREATHING DIFFICULTIES, DIZZINESS, LOSS OF COORDINATION AND HEADACHE ARE SIGNS OF EXPOSURE TO CONSENTRATIONS ABOVE THE TLV.
REPORTS HAVE ASSOCIATED REPEATED AND PROLONGED OCCUPATIONAL OVEREXPOSURE WITH PERMANENT BRAIN AND NERVOUS SYSTEM DAMAGE.
INTENTIONAL MISUSE BY DELIBERATELY CONCENTRATING AND INHALING THE CONTENTS MAY BE HARMFUL OR FATAL.

CARCINOGENICITY: NTP CARCINOGEN: N/A IARC MONOGRAPHS: N/A OSHA REGULATED: N//A
N/A

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
PRE-EXISTING DISORDERS OR DISEASES OF THE SKIN, EYE, LIVER, KIDNEY, NERVOUS SYSTEM, RESPIRATORY AND/OR PULMONARY SYSTEM, LUNG(E.G. ASTHMA-LIKE CONDISITONS).

EMERGENCY AND FIRST AID PROCEDURES
INHALATION: MOVE SUBJECT TO FRESH AIR. RESTORE BREATHING IF NECESSARY. TREAT SYMPTOMATICALLY AND CONSULT PHYSICIAN. EYE & SKIN CONTACT:FLUSH EYES WITH LARGE AMOUNT OF WATER FOR ATLEAST 15 MINUTES. SEE A PHYSICIAN IMMEDIATELY. WASH SKIN AFTER REMOVING CONTAMINATED CLOTHING WITH MILD SOAP AND WATER FOR 15 MINUTES. SEE PHYSICIAN IF IRRITATION PERSISTS. INGESTION: DRINK 1-2 GLASSES OF WATER TO DILUTE. DO NOT INDUCE VOMITING. CONSULT A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY. TREAT SYMPTOMATICALLY. NEVER GIVE LIQUIDS TO AN UNCONSCIOUS PERSON.

========== SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE ==========

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
STOP SPILL AT SOURCE. ELIMINATE ALL IGNITION SOURCES(FLARES, OPEN FLAMES, PILOT LIGHTS, ELECTRICAL SPARKS). USE ONLY NON SPARKING TOOLS FOR CLEAN UP. SUPPLY ADEQUATE VENTILATION. AVOID BREATHING OF VAPORS, USE RESPIRATOR. CONTAIN AND REMOVE WITH INERT ABSORBENT.

WASTE DISPOSAL METHOD
DISPOSE OF ACCORDING TO FEDERAL, STATE AND LOCAL REGULATIONS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
KEEP ALL CONTAINERS TIGHT AND IN AN UPRIGHT POSITION TO PREVENT LEAKS. STORE CONTAINERS OUT OF SUN AND AWAY FROM ALL HEAT SOURCES. THIS MATERIAL SHOULD BE GROUNDED WHEN POURING. DO NOT STORE NEAR HEAT, SPARKS OR OPEN FLAME.

OTHER PRECAUTIONS
DO NOT TAKE INTERNALLY.

========== SECTION VIII - CONTROL MEASURES ==========

RESPIRATORY PROTECTION
DO NOT BREATHE VAPORS OR SPRAY MIST. WEAR AN APPROPRIATE, PROPERLY FITTED RESPIRATOR (NIOSH/MSHA APPROVED) DURING APPLICATION AND OTHER USE OF THIS MATERIAL UNTIL VAPORS AND MISTS ARE EXHAUSTED AND EXPOSURE IS BELOW LISTED TLV(S). USE APPROVED CHEMICAL/CECHANICAL FILTERS DESIGNED TO REMOVE A COMBINATION OF PARTICLES AND VAPORS.

VENTILATION
PROVIDE SUFFICIENT VENTILATION TO KEEP VAPOR CONCENTRATIONS BELOW GIVEN TLV AND LEL LEVELS. IF LOCAL EXHAUST DOES NOT DEEP VAPOR CONCENTRATIONS BELOW LISTED LEVELS MECHANICAL EXHAUSE IS REQUIRED.

PROTECTIVE GLOVES
IMPERMEABLE CHEMICAL RESISTANT GLOVES SUCH AS NEOPRENE COATED GLOVES.

EYE PROTECTION
USE SAFETY EYEWARE WITH SIDESHIELDS TO PROTECT AGAINST CHEMICAL SPLASH OF LIQUIDS.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT
EYE BATH AND SHOWERS SHOULD BE READILY AVAILABLE. USE CHEMICAL REISTANT APRON, BOOTS OR OTHER CLOTHING NEEDED TO AVOID REPEATED OR FREQUENT SKING CONTACT. LIQUID MAY PENETRATE SHOES AND LEATHER CAUSING DELAYED IRRITATION.

WORK/HYGIENIC PRACTICES
WASH HANDS BEFORE AND AFTER EATING, SMOKING AND USING THE BATHROOM.

========== SECTION IX - DISCLAIMER ==========

TO THE BEST OF OUR KNOWLEDGE, THE INFORMATION CONTAINED HEREIN IS ACCURATE. HOWEVER, AMTECO, INC. DOES NOT ASSUME ANY LIABILITY WHATSOEVER FOR THE ACCURACY OF COMPLETENESS OF THE INFORMATION CONTAINED HEREIN. FINAL DETERMINATION OF SUITABILITY OF ANY MATERIAL IS THE SOLE RESPONSIBILITY OF THE USER.

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: SHAKE & SHINGLE SEALANT HMIS CODES: H F R P
PRODUCT CODE: IWP-200SER 2 2 1 G

========== SECTION I - MANUFACTURER IDENTIFICATION ==========

MANUFACTURER'S NAME: ANTECO INC
ADDRESS: Fiber Saver Coatings, Inc. • San Diego, CA • (619) 558-0800
EMERGENCY PHONE: 1-800-424-9300 INFORMATION PHONE: 1-800-969-4911
DATE REVISED : 01-05-98 NAME OF PREPARER :

DOT CLASSIFICATION: Combustible Liquid NOS, NA 1993, PGIII

========== SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION ==========

HAZARDOUS COMPONENTS	CAS NUMBER	OCCUPATIONAL EXPOSURE LIMITS OSHA PEL	ACGIH TLV	LD50 RATS	VAPOR PRESSURE mm Hg @ TEMP	WEIGHT PERCENT
SOLVENT NAPTHA(PETROLEUM)MEDIUM ALIPHATIC	64742-88-7	500PPM	100PPM	>25ML/KG	5.0 100F	< 5.0%

*** No toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372 are present. ***
THIS PRODUCT CONTAINS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

========== SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS ==========

BOILING POINT: 323 Deg F **SPECIFIC GRAVITY (H2O=1):** 0.9
VAPOR DENSITY: HEAVIER THAN AIR **EVAPORATION RATE:** SLOWER THAN ETHER
COATING V.O.C. : 0.46 LB/GL (55 G/L)
MATERIAL V.O.C.: 0.46 LB/GL (55 G/L)
SOLUBILITY IN WATER: NON SOLUBLE
APPEARANCE AND ODOR: AMBER, BROWN OR GRAY LIQUID MILD SOLVENT ODOR

========== SECTION IV - FIRE AND EXPLOSION HAZARD DATA ==========

FLASH POINT: 111 Deg F **METHOD USED:** TCC
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 1.0% **UPPER:** 7.0%

EXTINGUISHING MEDIA: FOAM, ALCOHOL FOAM, CO2, DRY CHEMICAL

SPECIAL FIREFIGHTING PROCEDURES
ALL FIREFIGHTING PERSONNEL SHOULD BE WEARING FULL PROTECTIVE EQUIPMENT INCLUDING SELF CONTAINED BREATHING APPARATUS. WATER MAY BE INEFFECTIVE BUT SHOULD BE USDED TO COOL EXPOSED CONTAINERS.

UI UAL FIRE AND EXPLOSION HAZARDS
KEEP CONTAINERS TIGHTLY CLOSED. ISOLATE FROM HEAT, ELECTRICAL EQUIPMENT, SPARKS, AND OPEN FLAME. CLOSED CONTAINERS MAY EXPLODE WHEN EXPOSED TO EXTREME HEAT.

SECTION V - REACTIVITY DATA

STABILITY: STABLE

CONDITIONS TO AVOID

EXTREME HEAT

INCOMPATIBILITY (MATERIALS TO AVOID)

NONE REASONABLY FORESEEABLE

HAZARDOUS DECOMPOSITION OR BYPRODUCTS

CARBON MONOXIDE, CARBON DIOXIDE, SMOKE, OXIDES OF NITROGEN

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

NONE

SECTION VI - HEALTH HAZARD DATA

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

MAY CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE, POSSIBLE UNCONSCIOUSNESS AND EVEN ASPHYXIATION.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE

DANGER CORROSIVE. CAUSES IRREVERSIBLE EYE DAMAGE. MODERATELY IRRITATING TO SKIN.MAY CAUSE ALLERGIC SKIN REACTION.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

MAY LEAD TO EXTRACTION OF NATURAL OILS WITH RESULTANT MILD IRRITATION.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

MAY CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, AND DIARRHEA. ASPIRATION OF MATERIAL INTO THE LUNGS CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.

HEALTH HAZARDS (ACUTE AND CHRONIC)

CHRONIC EXPOSURE MAY CAUSE LIVER AND KIDNEY DAMAGE. OVEREXPOSURE MAY HAVE THE FOLLOWING EFFECT:CARDIAC ABNORMALITIES.

CARCINOGENICITY: NTP? NO IARC MONOGRAPHS? NO OSHA REGULATED? NO

NONE

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

NOT KNOWN

EMERGENCY AND FIRST AID PROCEDURES

INHALATION; MOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NECESSARY.
SKIN CONTACT; WASH WITH SOAP & WATER.
EYE CONTACT; FLUSH WITH WATER FOR AT LEAST 15 MINUTES. CONSULT PHYSICIAN.
INGESTION; DRINK 1-2 GLASSES OF WATER TO DILUTE. DO NOT INDUCE VOMITING. CONSULT PHYSICIAN IMMEDIATELY.

========== SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE ==========

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
REMOVE ALL SOURCES OF IGNITION. AVOID BREATHING VAPORS. VENTILATE AREA. REMOVE WITH INERT MATERIAL. TOXIC TO FISH. KEEP OUT OF PONDS, STREAMS, LAKES, AND ANY OTHER WATERWAYS.

WASTE DISPOSAL METHOD
DISPOSE OF ACCORDING TO FEDERAL, STATE AND LOCAL REGULATIONS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAMES. CLOSE CONTAINERS AFTER EACH USE.

OTHER PRECAUTIONS
DO NOT TAKE INTERNALLY.

========== SECTION VIII - CONTROL MEASURES ==========

RESPIRATORY PROTECTION
ADEQUATE VENTILATION IS REQUIRED. USE NIOSH/MSHA APPROVED RESPIRATOR DEVICE.

VENTILATION
PROVIDE SUFFICIENT VENTILATION TO KEEP VAPORS CONCENTRATION BELOW GIVEN TLV AND LEL LEVELS.

PROTECTIVE GLOVES
REQUIRED FOR PROLONGED OR REPEATED CONTACT.

EYE PROTECTION
USE SAFETY EYEWEAR DESIGNED TO PROTECT AGAINST SPLASH OF LIQUIDS.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT
EYE BATH AND SHOWERS SHOULD BE AVAILABLE. USE CHEMICAL RESISTANT APRON, BOOTS OR OTHER CLOTHING IF NEEDED TO AVOID REPEATED OR FREQUENT SKIN CONTACT. LIQUID MAY PENETRATE SHOES AND LEATHER CAUSING DELAYED IRRITATION.

WORK/HYGIENIC PRACTICES
WASH HAND BEFORE EATING, SMOKING OR USING WASHROOM.

========== SECTION IX - DISCLAIMER ==========

DISCLAIMER
TO THE BEST OF OUR KNOWLEDGE, THE INFORMATION CONTAINED HEREIN IS ACCURATE. HOWEVER, AMTECO, INC. DOES NOT ASSUME ANY LIABILITY WHATSOEVER FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION CONTAINED HEREIN. FINAL DETERMINATION OF SUITABILITY OF ANY MATERIAL IS THE SOLE RESPONSIBILITY OF THE USER.

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: TWP-300 SERIES DECK&FURNITURE HMIS CODES: H F R P
PRODUCT CODE: TWF-300SER 2 2 0 G

========== SECTION I - MANUFACTURER IDENTIFICATION ==========

MANUFACTURER'S NAME: AMTECO INC.
ADDRESS: Fiber Saver Coatings, Inc. • San Diego, CA • (619) 558-0800
EMERGENCY PHONE: 1-800-424-9300 INFORMATION PHONE: 1-800-969-4811
DATE REVISED : 01-05-98 NAME OF PREPARER :
DOT CLASSIFICATION: Combustible Liquid NOS,NA 1993, PGIII

========== SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION ==========

HAZARDOUS COMPONENTS	CAS NUMBER	OCCUPATIONAL EXPOSURE LIMITS OSHA PEL	ACGIH TLV	LD50 RATS	VAPOR PRESSURE mm Hg @ TEMP		WEIGHT PERCENT
SOLVENT NAPTHA(PETROLEUM)MEDIUM ALIPHATIC	64742-88-7	500PPM	100PPM	>25ML/KG	5.0	100F	35
*COBALT DRYER 12%	7440-048-4	0.1 mg/m3	0.02 mg/m3	>25 ML/KG	2.7	68F	0.13

* Indicates toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372.

========== SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS ==========

BOILING RANGE: 248 to 323 Deg F SPECIFIC GRAVITY (H2O=1): 0.9
VAPOR DENSITY: HEAVIER THAN AIR EVAPORATION RATE: SLOWER THAN ETHER
COATING V.O.C. : 2.90 LB/GL (348 G/L)
MATERIAL V.O.C.: 2.90 LB/GL (348 G/L)
SOLUBILITY IN WATER: NON SOLUBLE
APPEARANCE AND ODOR: VARY COLOR-MILD SOLVENT ODOR

========== SECTION IV - FIRE AND EXPLOSION HAZARD DATA ==========

FLASH POINT: 111 Deg F METHOD USED: TCC
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 1.0% UPPER: 7.0%

EXTINGUISHING MEDIA: FOAM, ALCOHOL FOAM, CO2, DRY CHEMICAL

SPECIAL FIREFIGHTING PROCEDURES
ALL FIREFIGHTING PERSONNEL SHOULD BE WEARING FULL PROTECTIVE EQUIPMENT INCLUDING SELF CONTAINED BREATHING APPARATUS.
WATER MAY BE INEFFECTIVE BUT SHOULD BE USDED TO COOL EXPOSED CONTAINERS.

U. SUAL FIRE AND EXPLOSION HAZARDS
KEEP CONTAINERS TIGHTLY CLOSED. ISOLATE FROM HEAT, ELECTRICAL EQUIPMENT, SPARKS, AND OPEN FLAME. CLOSED CONTAINERS MAY EXPLODE WHEN EXPOSED TO EXTREME HEAT.

SECTION V - REACTIVITY DATA

STABILITY: STABLE
CONDITIONS TO AVOID
EXTREME HEAT

INCOMPATIBILITY (MATERIALS TO AVOID)
NONE REASONABLY FORESEEABLE

HAZARDOUS DECOMPOSITION OR BYPRODUCTS
CARBON MONOXIDE, CARBON DIOXIDE, SMOKE, OXIDES OF NITROGEN

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR
NONE

SECTION VI - HEALTH HAZARD DATA

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE. POSSIBLE UNCONSCIOUSNESS AND EVEN ASPHYXIATION.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY CAUSE SEVERE IRRITATION, REDNESS, TEARING, BLURRED VISION, AND A SENSATION OF SEEING HALOS AROUND LIGHTS.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY LEAD TO EXTRACTION OF NATURAL OILS WITH RESULTANT MILD IRRITATION.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, AND DIARRHEA. ASPIRATION OF MATERIAL INTO THE LUNGS CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.

HEALTH HAZARDS (ACUTE AND CHRONIC)
CHRONIC EXPOSURE MAY CAUSE LIVER AND KIDNEY DAMAGE. OVEREXPOSURE MAY HAVE THE FOLLOWING EFFECT:CARDIAC ABNORMALITIES.

CARCINOGENICITY: NTP? NO IARC MONOGRAPHS? YES OSHA REGULATED? NO
NONE

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NOT KNOWN

EMERGENCY AND FIRST AID PROCEDURES
INHALATION; MOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NECESSARY.
SKIN CONTACT; WASH WITH SOAP & WATER.
EYE CONTACT; FLUSH WITH WATER FOR AT LEAST 15 MINUTES. CONSULT PHYSICIAN.
INGESTION; DRINK 1-2 GLASSES OF WATER TO DILUTE. DO NOT INDUCE VOMITING. CONSULT PHYSICIAN IMMEDIATELY.

========== SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE ==========

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
ELIMINATE ALL SOURCES OF IGNITION. AVOID BREATHING VAPORS. VENTILATE AREA. REMOVE WITH INERT MATERIAL. THIS MATERIAL IS TOXIC TO FISH. DO NOT POLLUTE WATERWAYS.

WASTE DISPOSAL METHOD
INCINERATE IN APPROVED FACILITY. DO NOT INCINERATE CLOSED CONTAINERS. DISPOSE OF ACCORDING TO FEDERAL, STATE, AND LOCAL POLLUTION CONTROL REQUIREMENTS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAMES. CLOSE CONTAINERS AFTER EACH USE.

OTHER PRECAUTIONS
DO NOT TAKE INTERNALLY.

========== SECTION VIII - CONTROL MEASURES ==========

RESPIRATORY PROTECTION
ADEQUATE VENTILATION IS REQUIRED. USE NIOSH/MSHA APPROVED RESPIRATOR DEVICE.

VENTILATION
PROVIDE SUFFICIENT VENTILATION TO KEEP VAPORS CONCENTRATION BELOW GIVEN TLV AND LEL LEVELS.

PROTECTIVE GLOVES
REQUIRED FOR PROLONGED OR REPEATED CONTACT.

EYE PROTECTION
USE SAFETY EYEWEAR DESIGNED TO PROTECT AGAINST SPLASH OF LIQUIDS.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT
EYE BATH AND SHOWERS SHOULD BE AVAILABLE. USE CHEMICAL RESISTANT APRON, BOOTS OR OTHER CLOTHING IF NEEDED TO AVOID REPEATED OR FREQUENT SKIN CONTACT. LIQUID MAY PENETRATE SHOES AND LEATHER CAUSING DELAYED IRRITATION.

WORK/HYGIENIC PRACTICES
WASH HAND BEFORE EATING, SMOKING OR USING WASHROOM.

========== SECTION IX - DISCLAIMER ==========

DISCLAIMER
TO THE BEST OF OUR KNOWLEDGE, THE INFORMATION CONTAINED HEREIN IS ACCURATE. HOWEVER, AMTECO, INC. DOES NOT ASSUME ANY LIABILITY WHATSOEVER FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION CONTAINED HEREIN. FINAL DETERMINATION OF SUITABILITY OF ANY MATERIAL IS THE SOLE RESPONSIBILITY OF THE USER.

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: TWP-500 SERIES VOC COMPLIANT HMIS CODES: H F R P
PRODUCT CODE: TWP-500SER 2 2 0 G

========== SECTION I - MANUFACTURER IDENTIFICATION ==========

MANUFACTURER'S NAME: AMTECO INC.
ADDRESS: Fiber Saver Coatings, Inc. • San Diego, CA • (619) 558-0800
EMERGENCY PHONE: 1-800-424-9300 INFORMATION PHONE: 1-800-969-4811
DATE REVISED : 01-05-98 NAME OF PREPARER :
DOT CLASSIFICATION: Combustible Liquid NOS, NA1993, PGIII

========== SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION ==========

HAZARDOUS COMPONENTS	CAS NUMBER	OCCUPATIONAL EXPOSURE LIMITS OSHA PEL	ACGIH TLV	LD50 RATS	VAPOR PRESSURE mm Hg @ TEMP		WEIGHT PERCENT
SOLVENT NAPTHA(PETROLEUM)MEDIUM ALIPHATIC	64742-88-7	500PPM	100PPM	>25ML/KG	5.0	100F	30
TEXANOL ESTER-ALCOHOL	25265-77-4				1.0	182F	< 5.0%

*** No toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372 are present. ***

========== SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS ==========

BOILING RANGE: 323 to 471 Deg F SPECIFIC GRAVITY (H2O=1): 0.9
VAPOR DENSITY: HEAVIER THAN AIR EVAPORATION RATE: SLOWER THAN ETHER
COATING V.O.C. : 2.56 LB/GL (307 G/L)
MATERIAL V.O.C.: 2.51 LB/GL (301 G/L)
SOLUBILITY IN WATER: NON SOLUBLE
APPEARANCE AND ODOR: AMBER,BROWN LIQUID, VERY MILD SOLVENT ODOR

========== SECTION IV - FIRE AND EXPLOSION HAZARD DATA ==========

FLASH POINT: 111 Deg F METHOD USED: TCC
FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 0.6% UPPER: 7.0%

EXTINGUISHING MEDIA: FOAM, CO2, DRY CHEMICAL

SPECIAL FIREFIGHTING PROCEDURES
ALL FIREFIGHTING PERSONNEL SHOULD BE WEARING FULL PROTECTIVE EQUIPMENT INCLUDING SELF CONTAINED BREATHING APPARATUS.
WATER MAY BE INEFFECTIVE BUT SHOULD BE USDED TO COOL EXPOSED CONTAINERS.

UNUSUAL FIRE AND EXPLOSION HAZARDS
KEEP CONTAINERS TIGHTLY CLOSED. ISOLATE FROM HEAT, ELECTRICAL EQUIPMENT, SPARKS, AND OPEN FLAME. CLOSED CONTAINERS MAY EXPLODE WHEN EXPOSED TO EXTREME HEAT.

SECTION V - REACTIVITY DATA

STABILITY: STABLE

CONDITIONS TO AVOID
EXTREME HEAT

INCOMPATIBILITY (MATERIALS TO AVOID)
NONE REASONABLY FORESEEABLE

HAZARDOUS DECOMPOSITION OR BYPRODUCTS
CARBON MONOXIDE, CARBON DIOXIDE, SMOKE, OXIDES OF NITROGEN

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR
NONE

SECTION VI - HEALTH HAZARD DATA

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA, HEADACHE, POSSIBLE UNCONSCIOUSNESS AND EVEN ASPHYXIATION.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY CAUSE SEVERE IRRITATION, REDNESS, TEARING, BLURRED VISION, AND A SENSATION OF SEEING HALOS AROUND LIGHTS.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY LEAD TO EXTRACTION OF NATURAL OILS WITH RESULTANT MILD IRRITATION.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
MAY CAUSE GASTROINTESTINAL IRRITATION, NAUSEA, VOMITING, AND DIARRHEA. ASPIRATION OF MATERIAL INTO THE LUNGS CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.

HEALTH HAZARDS (ACUTE AND CHRONIC)
CHRONIC EXPOSURE MAY CAUSE LIVER AND KIDNEY DAMAGE. OVEREXPOSURE MAY HAVE THE FOLLOWING EFFECT:CARDIAC ABNORMALITIES.

CARCINOGENICITY: NTP? NO IARC MONOGRAPHS? NO OSHA REGULATED? NO
NONE

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NOT KNOWN

EMERGENCY AND FIRST AID PROCEDURES
INHALATION; MOVE TO FRESH AIR, GIVE ARTIFICIAL RESPIRATION IF NECESSARY.
SKIN CONTACT; WASH WITH SOAP & WATER.
EYE CONTACT; FLUSH WITH WATER FOR AT LEAST 15 MINUTES. CONSULT PHYSICIAN.
INGESTION; DRINK 1-2 GLASSES OF WATER TO DILUTE. DO NOT INDUCE VOMITING. CONSULT PHYSICIAN IMMEDIATELY.

========== SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE ==========

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
[illegible] ALL SOURCES OF IGNITION. AVOID BREATHING VAPOR. VENTILATE AREA. REMOVE WITH INERT MATERIAL. THIS MATERIAL IS TOXIC TO FISH. DO NOT POLLUTE WATERWAYS.

WASTE DISPOSAL METHOD
INCINERATE IN APPROVED FACILITY. DO NOT INCINERATE CLOSED CONTAINERS. DISPOSE OF ACCORDING TO FEDERAL, STATE, AND LOCAL POLLUTION CONTROL REQUIREMENTS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAMES. CLOSE CONTAINERS AFTER EACH USE.

OTHER PRECAUTIONS
DO NOT TAKE INTERNALLY.

========== SECTION VIII - CONTROL MEASURES ==========

RESPIRATORY PROTECTION
ADEQUATE VENTILATION IS REQUIRED. USE NIOSH/MSHA APPROVED RESPIRATOR DEVICE.

VENTILATION
PROVIDE SUFFICIENT VENTILATION TO KEEP VAPORS CONCENTRATION BELOW GIVEN TLV AND LEL LEVELS.

PROTECTIVE GLOVES
REQUIRED FOR PROLONGED OR REPEATED CONTACT.

EYE PROTECTION
USE SAFETY EYEWEAR DESIGNED TO PROTECT AGAINST SPLASH OF LIQUIDS.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT
EYE BATH AND SHOWERS SHOULD BE AVAILABLE. USE CHEMICAL RESISTANT APRON, BOOTS OR OTHER CLOTHING IF NEEDED TO AVOID REPEATED OR FREQUENT SKIN CONTACT. LIQUID MAY PENETRATE SHOES AND LEATHER CAUSING DELAYED IRRITATION.

WORK/HYGIENIC PRACTICES
WASH HAND BEFORE EATING, SMOKING OR USING WASHROOM.

========== SECTION IX - DISCLAIMER ==========

DISCLAIMER
TO THE BEST OF OUR KNOWLEDGE, THE INFORMATION CONTAINED HEREIN IS ACCURATE. HOWEVER, AMTECO, INC. DOES NOT ASSUME ANY LIABILITY WHATSOEVER FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION CONTAINED HEREIN. FINAL DETERMINATION OF SUITABILITY OF ANY MATERIAL IS THE SOLE RESPONSIBILITY OF THE USER.

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: GRAFFITI MAX URETHANE
PRODUCT CODE: 2-605

HMIS CODES: H 2 F 2 R 0 P G

========== SECTION I - MANUFACTURER IDENTIFICATION ==========

MANUFACTURER'S NAME: AMTECO INC.
ADDRESS: AMTECO INC, ST. LOUIS, MO. 63106
EMERGENCY PHONE: 1-800-424-9300
INFORMATION PHONE: 1-800-969-4811
DATE REVISED : 11-18-93
NAME OF PREPARER :

========== SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION ==========

HAZARDOUS COMPONENTS	CAS NUMBER	OCCUPATIONAL EXPOSURE LIMITS OSHA PEL	ACGIH TLV	OTHER	VAPOR PRESSURE mm Hg @ TEMP		WEIGHT PERCENT
POLYMERIC HEXAMETHYLENE DIISOCYANATE		150 TWA	150 TWA		0.0	68F	55
*AROMATIC HYDROCARBON	64742-95-6	200PPM	200PPM		12.4	230F	32
PROPYLENE GLYCOL METHYL ETHER ACETATE	108-65-6	NE	NE	NE	3.8	77F	< 5.0%

* Indicates toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372.

========== SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS ==========

BOILING RANGE: 284 to 300 Deg F
SPECIFIC GRAVITY (H2O=1): 1.0
VAPOR DENSITY: HEAVIER THAN AIR
EVAPORATION RATE: SLOWER THAN ETHER
COATING V.O.C. : 4.30 LB/GL (515 G/L)
MATERIAL V.O.C.: 4.30 LB/GL (515 G/L)
SOLUBILITY IN WATER: REACTS SLOWLY WITH WATER TO LIBERATE CO2 GAS
APPEARANCE AND ODOR: AMBER LIQUID WITH SLIGHT AROMATIC ODOR

========== SECTION IV - FIRE AND EXPLOSION HAZARD DATA ==========

FLASH POINT: 110 Deg F
METHOD USED: TCC
FLAMMABLE LIMITS IN AIR BY VOLUME- **LOWER:** 1.0% **UPPER:** 10.0%

EXTINGUISHING MEDIA: FOAM, CO2, DRY CHEMICAL, WATER FOG

SPECIAL FIREFIGHTING PROCEDURES

EMERGENCY EQUIPMENT WITH FULL SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING SHOULD BE WORN BY FIR
HTERS. DURING A FIRE,MDI VAPORS AND OTHER IRRITATING, HIGHLY TOXIC GASES MAY BE GERNERATED BY COMBUSTION.

UNUSUAL FIRE AND EXPLOSION HAZARDS

AT TEMPERATURES GREATER THAN 400F POLYMERIC MDI CAN POLYMERIZE AND DECOMPOSE WHICH CAN CAUSE PRESSURE BUILD-UP IN CLOSED CONTAINERS. EXPLOSIVE RUPTURE IS POSSIBLE. USE COLD WATER TO COOL FIRE-EXPOSED CONTAINERS.

========== SECTION V - REACTIVITY DATA ==========

STABILITY: STABLE

CONDITIONS TO AVOID

EXTREME HEAT. CONTAMINATION WITH WATER.

INCOMPATIBILITY (MATERIALS TO AVOID)

WATER, AMINES, STRONG BASES, ALCOHOLS. WILL CAUSE SOME CORROSION TO COPPER ALLOYS AND ALUMINUM.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS

BY HIGH HEAT AND FIRE:CARBON MONOXIDE, OXIDES OF NITROGEN, TRACES OF HCN, MDI VAPORS OR AEROSOLS.

HAZARDOUS POLYMERIZATION: MAY OCCUR

CONTACT WITH MOISTURE,OTHER MATERIALS WHICH REACT WITH ISOCYANATES, OR TEMPERATURES ABOVE 400F MAY CAUSE POLYMERIZATION.

========== SECTION VI - HEALTH HAZARD DATA ==========

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

MAY CAUSE BURNING SENSATION OF THE MUCOUS MEMBRANES IN THE RESPIRATORY TRACT(NOSE, THROAT, LUNGS) CAUSING RUNNY NOSE, SORE THROAT, COUGHING, CHEST DISCOMFORT, SHORTNESS OF BREATH AND REDUCED LUNG FUNCTION.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE

SKIN-REDDENING, SWELLING, RASH, SCALING OR BLISTERING. CURED MATERIAL IS HARD TO REMOVE.
EYES-TEARING, REDDENING, AND SWELLING.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

MAY CAUSE SWELLING, RASH, SCALING, BLISTERING, AND IN SOME CASES, SKIN SENSITIZATION.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

MAY CAUSE IRRITATION AND CORROSIVE ACTION IN THE MOUTH, STOMACH TISSUE AND DIGESTIVE TRACT. SYMPTOMS CAN INCLUDE SORE THROAT, ABDOMINAL PAIN, NAUSEA, VOMITING AND DIARRHEA.

HEALTH HAZARDS (ACUTE AND CHRONIC)

OVER EXPOSURE CAN LEAD TO BRONCHITIS, BRONCHIAL SPASM AND PULMONARY EDEMA (FLUIDS IN THE LUNGS). THESE EFFECTS ARE USUALLY REVERSIBLE. CHEMICAL OR HYPERSENSITIVITY PNEUMONITIS HAS ALSO BEEN REPORTED. CHEMICAL ASTHMA IS ALSO POSSIBLE.

CARCINOGENICITY: NTP? NO IARC MONOGRAPHS? NO OSHA REGULATED? YES

NOT LISTED BY NTP, IARC OR REGULATED BY OSHA AS CARCINOGENS.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

ASTHMA, BRONCHITIS, EMPHYSEMA, BRONCHIAL HYPERREACTIVITY, SKIN ALLERGIES, ECZEMA

EMERGENCY AND FIRST AID PROCEDURES

EYES:FLUSH WITH COPIOUS AMOUNTS OF WATER FOR 15 MINUTES, WHILE HOLDING EYELIDS AOPEN ALL THE TIME.
SKIN-WASH EFFECTED AREA WITH SOAP AND WATER.
INHALATION-MOVE TO FRESH AIR. CONSULT PHYSICIAN IF ASTHMATIC SYMPTOMS OCCUR.
INGESTION-DO NOT INDUCE VOMITING. GIVE 1 TO 2 CUPS OF MILK OR WATER TO DRINK. DO NOT GIVE ANYTHING NBY MOUTH TO AN UNCONSCIOUS PERSON. CONSULT PHYSICIAN IMMEDIATELY.

FSC Coatings

Coatings Engineered For Ultimate Performance

California Air Resources Board Meeting

Comments On

Suggested Control Measure For Architectural Coatings

September 21, 1999

Topics For Discussion:

I. **Industrial Maintenance Coatings** -- 250 vs. 420 g/l For Air Dry Primers & Topcoats

No Equivalent Performance Replacements -- Not Water-bornes or Nor Multi-Components

A. Are We Purposefully Or Accidentally Eliminating Air Dry Systems? If so, why?
   1) What about health benefits of single component systems vs. body tissue reactive components in common 2 component high performance systems?
   2) What about renewable resource use in air dry resin systems?
   3) What about ease of use and ease of maintenance? Recoatability?
   4) What are you being told are the replacements and their performance?
   5) What are the life cycle costs? Life cycle emissions of more frequent recoats with shorter lives?
   6) What are the costs of lost business to other states & other countries with lower emission standards?

rimer Performance Comparison: **Salt Fog Tests For Primers** (See Chart)
   1) State Of Technology Of Air Dry Systems -- Zero-Rust @ 2400 Hours On Brush Finished & Rusty Surfaces With Zero Scribe Creep
   2) **Water-bornes Have 5-20% Longevity** Of New Zero-Rust Solvent-borne Technology
   3) Zero-Rust Represents The State-Of-The-Art For Air Dry Systems -- higher performance than **solvent borne epoxies** (including epoxy mastics) with less than ideal surface preparation **including smooth steel and rusty surfaces.**
   4) **High Temperature Resistance** Than Epoxies -- greater than 350 degrees F;
      -Vandenberg Missile Launch Facilities
      -Indonesian Geothermal Plant
   [redacted]
   6) **Eliminates The Need For Costly White Metal & Near White Metal Blasts**

FSC Coatings (cont)

C. Topcoats Performance Comparison:

1) *Weatherometer – 88-97% gloss retention at 1600 hrs for single component SA-3*
70-80% gloss retention for 2 component industrial urethanes

2) *Direct Impact – 150-160 inch-lbs for SA-3;*
130-140 inch-lbs for common industrial urethanes

3) *Reverse Impact (best adhesion measure) –*
135-150 inch-lbs for SA-3;
5-50 inch-lbs for industrial urethanes

4) *Recoatability and ease of maintenance – superior for single component, SA-3 materials*

5) *Maintain 420 g/l for maximum performance and acceptable cure times*

**Recommendation: Allow increased VOC levels for these higher performance maintenance systems to survive at state-of-the-art performance levels:*
- *Primers – 300 g/l or higher*
- *Topcoats – 400 g/l or higher for mild solvents with higher flash points*
350 g/l or higher for stronger solvent systems

II. Acrylic Lacquers For Sealing Concrete, Pavers and Roadbases – 550 g/l or above desired

No Performance Equivalent
-Epoxies Chalk & Lack Adhesion On Surfaces With Marginal Profile
-Urethanes Lack Adhesion & Are Slippery
-Water-borne Too Soft For Hot Tire Traffic
Example Projects:
-Highway 111 Roadbase & Sidewalks – Sheen present applied 7 years ago
-San Francisco's Famed Pier 39 – Still beads water after 7 years
250% cost increase to make 400 g/l formula vs. Standard Formula
150% cost increase to make 550 g/l formula vs. Standard Formula

**Recommendation: Make lacquer definition include these systems that can also be used for concrete, stone and other masonry surfaces for 550 g/l limit to apply.*

III. Floor Coatings – What Is This Really?

Implies 100 % Solids Technology – Legislates in Epoxy & Urethanes As Only Qualifiers
Low Adhesion For Multi component Systems Unless Sandblasted or Beadblasted – very expensive
Lower Solids Sealer/Primers Needed For Proper Adhesion – 350 g/liter With Current

FSC Coatings (cont)

Solvents; 250 g/l With T-Butyl Acetate
Questionable Maintainability & Recoatability

To Achieve Higher Solids At Useable Viscosities & More Reasonable Cure Rates
-Must Lower The Molecular Weights Of The Molecules Involved
-Urethanes, Alkyds, Acrylics, Epoxies, etc.
-Like Using Molecules That Have Aged 2-4 Years Before Putting Into Service

What Is The Real Cost Of Using These "Pre-Aged Systems"?
-Initial Cost
-More Frequent Applications
-Work Force Qualifications – Very Questionable

***Recommendation: Keep VOC's at 350 g/l For Urethane & Epoxy Sealers And Topcoats** – Single & Multi component*

III. New Quick Dry Varnish Technology vs. Nitrocellulose Lacquers –
Very Quick Dry – 10-20 minutes dry time
Superior Performance – Enhanced UV & Water Resistance
Same Ease of Application,
Superior Health Benefits – mild solvents
Higher Flash Point
Need Similar VOC Limits – 350 g/l too low
450 g/l VOC needed

IV. Wood Stains –
What Are You Targeting Here?
Oil Stains Preferred – 350 g/l marginal now for reasonable cure rates
We Are #1 In This Area – See Test Results
Penetration Of Up to 1" In Aged Wood – Cedar & Redwood
Water-borne Alkyds Unstable – Cannot Penetrate Like Oil-Borne Counterparts.

*****Recommendation: Keep the 350 g/l VOC** to minimize life cycle costs, wood replacement and life cycle emissions.*

V. Specialty Coatings – High Performance Anti-Graffiti
Lower Solids Systems More Chemical Resistant & Higher Color Retention
Low Volume Systems
Used Mostly By Schools And Governments

Recommendation: Keep VOC At 550 g/l or higher.

VI. Solvent Selection – Strength & Safety
Need Strong, High Flash Point Solvents For Safe Products
Keep Perchloroethylene (Perc)
Add T-Butyl Acetate – 80 degree F Flash Point

Sem-show:airreapr.199

Henry COMPANY

10 March 2000

Mr. Jim Nyarady
California Air Resources Board
2020 L Street
Sacramento, CA 95812

Sent via e-mail to jnyarady@arb.ca.gov. with hardcopy overnight

Re: Proposed SCM VOC limit for asphaltic primers for roof coatings

Dear Mr. Nyarady:

As we discussed in our meeting with the CARB staff on 18 January, Henry Company does not believe that functional asphaltic primers can be formulated at the proposed VOC limits, which are much below those in effect in SCAQMD today.

Purpose of Asphaltic Primer

Asphaltic primers are used to prepare an otherwise cleaned roof surface for the application of an asphaltic coating. The key performance requirements are to use a compatible asphalt and to have a low viscosity at low temperatures (jobs are primed first thing in the morning). Thus the primer: 8a-1

- wets out any residual dust
- wets any metal surfaces
- penetrates a porous roof surface (wood or concrete roof deck, old roof membrane, etc.), and
- leaves a very thin asphalt film which is compatible with the coating to be applied.

Reducing the VOC content of the primer rapidly increases the viscosity, especially at cold temperatures. Keeping the viscosity at even semi-acceptable levels requires reducing the quality of the asphalt, transitioning from pure air-blown roofing asphalt to blends with softer asphalts and perhaps asphaltic oils. Changing the bitumen this way prolongs the drying time and eventually creates a surface which is incompatible with the coating, thus causing coating failures.

2911 Slauson Avenue • Huntington Park, CA 90255
(323) 583-5000 • FAX (323) 582-6429 • www.henry.com

Viscosity vs Temperature Data

Attached is an Excel spreadsheet ["CARB_primers.xls"] which shows the viscosities of several primers versus temperature. These samples include a D-41 compliant, 500 g/l primer as a control, commercially available primers from Henry and several other manufacturers which comply with the SCAQMD Rule 1113 (350 g/l) in effect today, and the low VOC cutback we showed you in January. Note that the viscosities shown here were measured with a Brookfield viscometer, which uses different units than the Saybolt viscosities presented in RCMA's data.

As you can see:

- None of the alternate primers come within a factor of 10 of the viscosity of the control; most are ~100 times heavier.

- None of the products comply with the even lower VOC limits proposed in the draft SCM.

8a-1

Primer with a viscosity at the application temperature below ~200 – 400 centipoise is acceptable. As you saw at our demonstration, the higher viscosity makes it more difficult to apply and leaves a heavier applied film. This adds more solvent to the surface, delays the job by prolonging the dry time of the primer, and may contribute to the functional problems seen with some of the low-VOC primers.

Primer – Induced Failures

Last January you asked whether we could document performance problems of roof coatings when applied over low-VOC primers.

Attached are photographs of a roof test we performed last spring on our plant roof in Huntington Park. The test bed was an old emulsion-coated roof membrane. This surface was cleaned and primed with ~4' wide stripes of four different primers, running cross-wise in the photo ["primer_test.jpg"]. After the primers had dried completely, this area was then coated with two different aluminum roof coatings, "A" and "B," running up and down in the photo.

Stacked from top to bottom in the photo, the primers were "3," "5," "4," and "11." "3" and "11" are two of the 350 g/l primers shown in the viscosity charts, while "4" and "5" are D-41 compliant primers.

The photos were taken when the coatings were about 9 months old. As you can see in the first photo and in ["prim_tst_4_v_11_far" and "prim_tst_4_v_11_closeup"], both aluminum coatings over the "11" primer are alligatoring and failing badly. We speculate that this is because a non-airblown asphalt was used. The same problem is occurring over the "3" primer ["prim_tst_3_v_5_closeup"], although so far to a much lesser extent.

Exempt Solvents

The only "non-ozone depleting" exempt solvent in Section 2.57 into which asphalt will dissolve is parachlorobenzotrifluoride, sold under the trade name Oxsol® 100.

This solvent presents some problems if used in a roofing primer:

8a-2

- The solvent has an offensive odor – a combination of toluene and mothballs. In a time where the odor of ordinary mineral spirits causes complaints, this will not be acceptable on many job sites.

- The solvent is extremely expensive, roughly $30 per gallon in drums. [I don't believe that anyone makes enough asphalt primer to be able to dedicate a new solvent tank to the product.] A gallon of primer at the proposed limits will require ~1/2 gallon of exempt solvent, which will increase the cost of the material by more than a factor of 10.

For these reasons, we do not believe that the use of exempt solvents provides a practical means of meeting the proposed new limits.

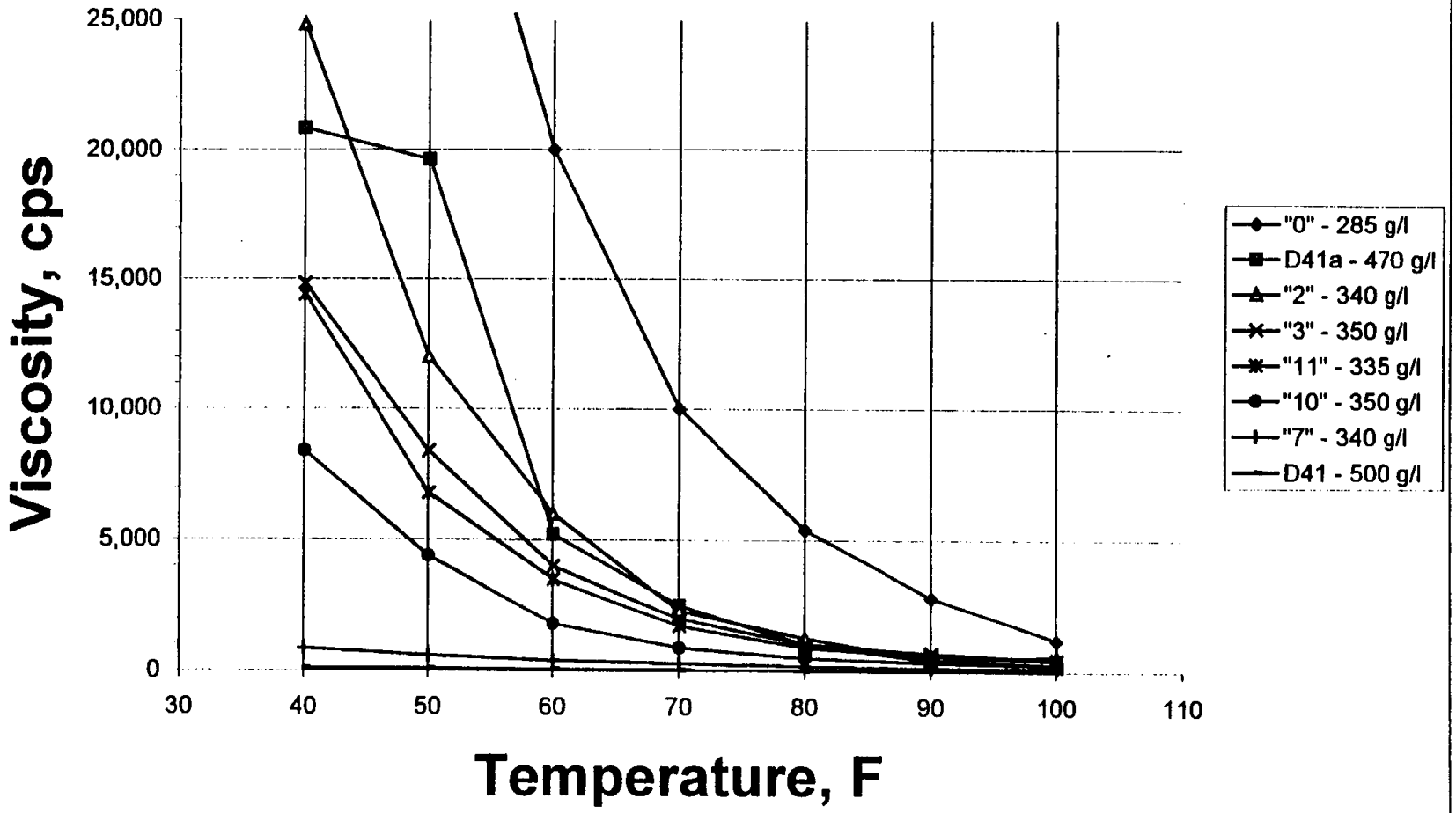
If you have any questions, please call me at (323) 908-5279. Note that this is a new direct-dial phone number.

Paul A. Beemer
Technical Director, Coatings Division
Henry Company

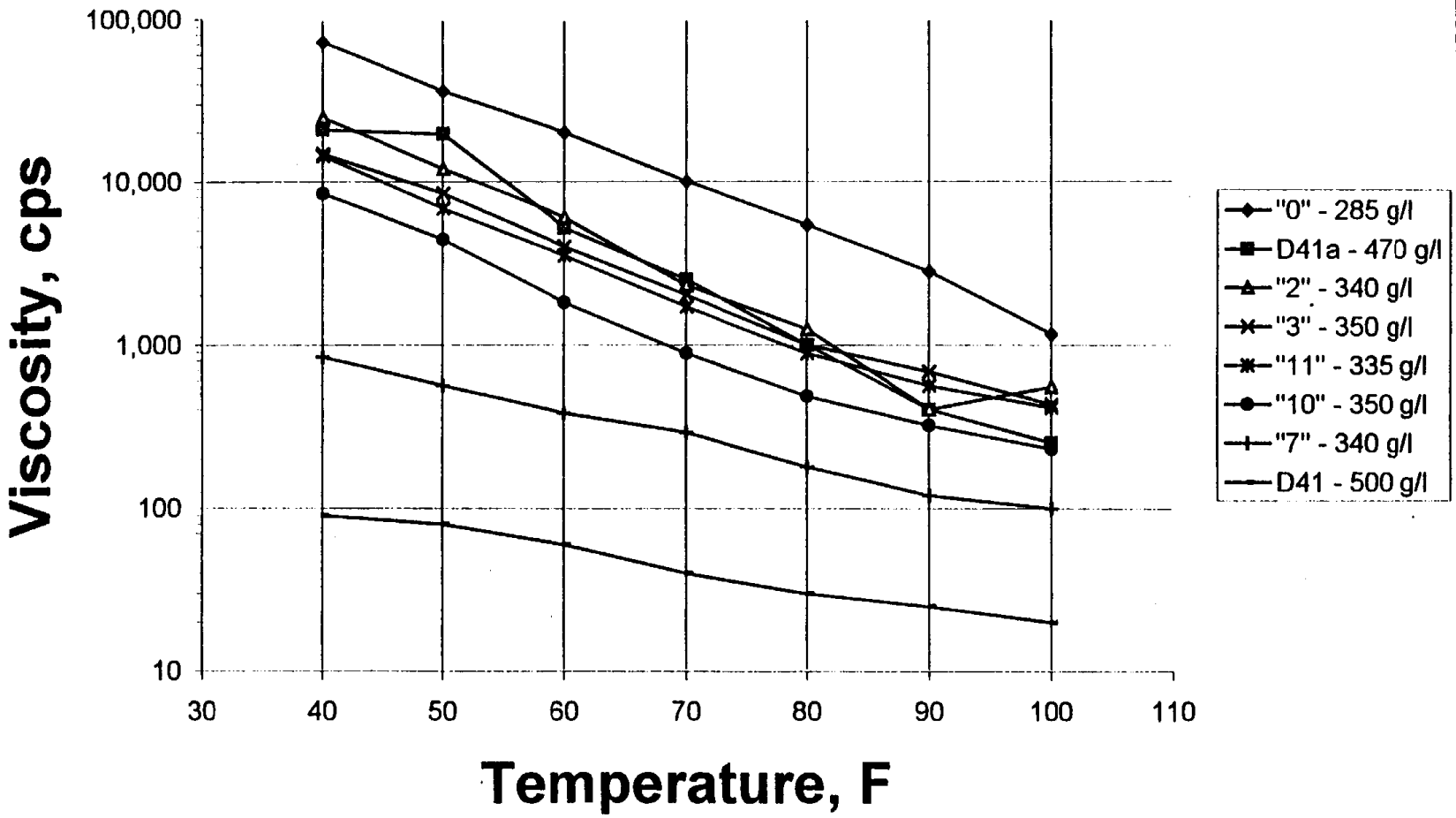
Primer Viscosity study at various temperatures - Brookfield RVF								
	Viscosity in CPS							
	"0" - 285 g/l	D41a - 470 g/	"2" - 340 g/l	"3" - 350 g/l	"11" - 335 g/l	"10" - 350 g/l	"7" - 340 g/l	D41 - 500 g/l
40	72,000	20,800	24,800	14,800	14,400	8,400	840	90
50	36,000	19,600	12,000	8,400	6,800	4,400	560	80
60	20,000	5,200	6,000	4,000	3,500	1,800	380	60
70	10,000	2,500	2,300	2,000	1,700	880	290	40
80	5,400	1,000	1,240	1,000	880	480	180	30
90	2,800	400	400	680	560	320	120	25
100	1,160	250	550	430	410	230	100	20

Primer descriptions	
0	semi-hard asphalt cut in Rule 66 mineral spirits (sample presented to CARB on 18 January)
D41a	control ASTM D-41 primer with reduced solvent
2	SCAQMD compliant product
3	SCAQMD compliant product
11	SCAQMD compliant product -- slow dry
10	SCAQMD compliant product -- very slow dry (sample presented to CARB on 18 January)
7	SCAQMD compliant product -- slow dry
D41	control ASTM D-41 primer (sample presented to CARB on 18 January)

Primer Viscosity vs Temperature



Primer Viscosity vs Temperature



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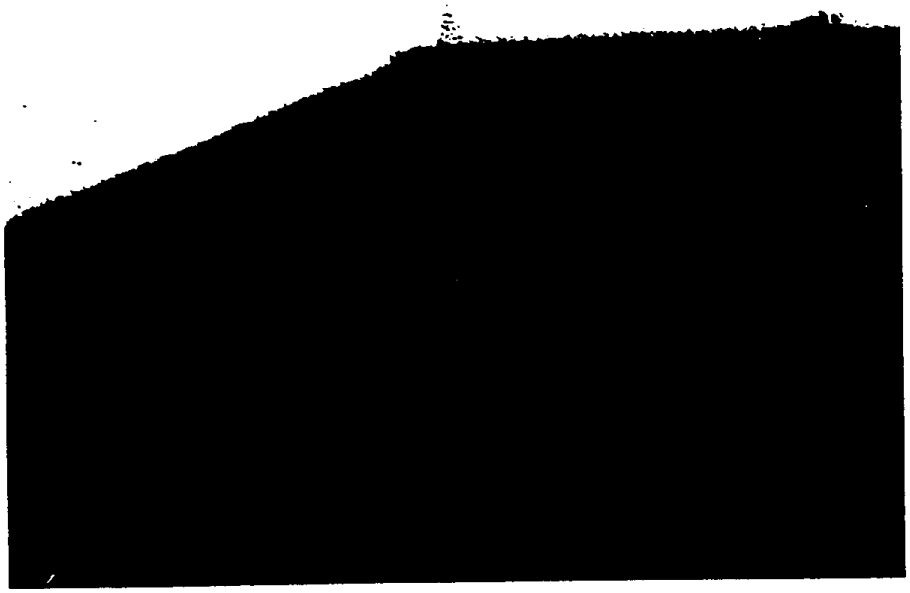
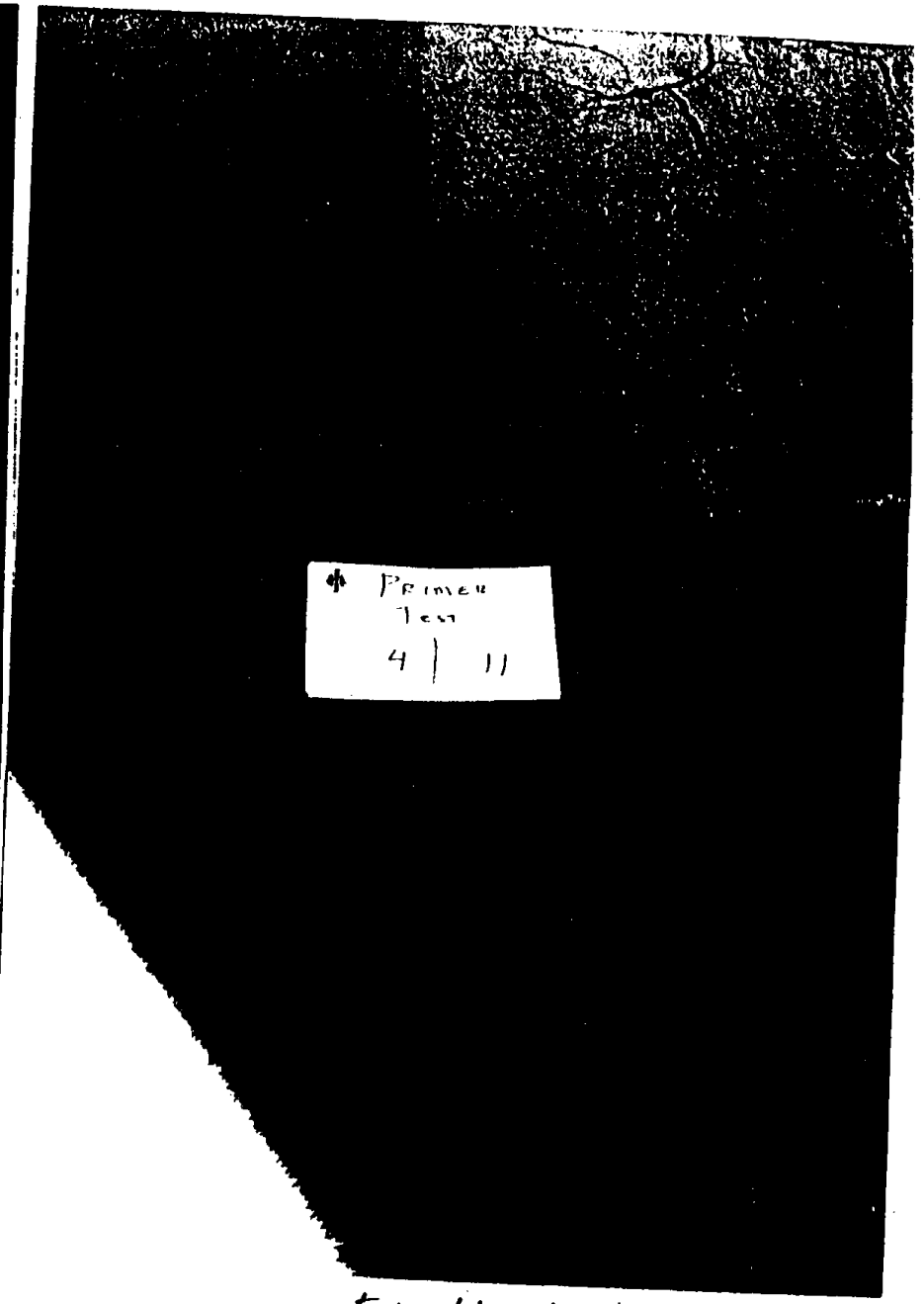
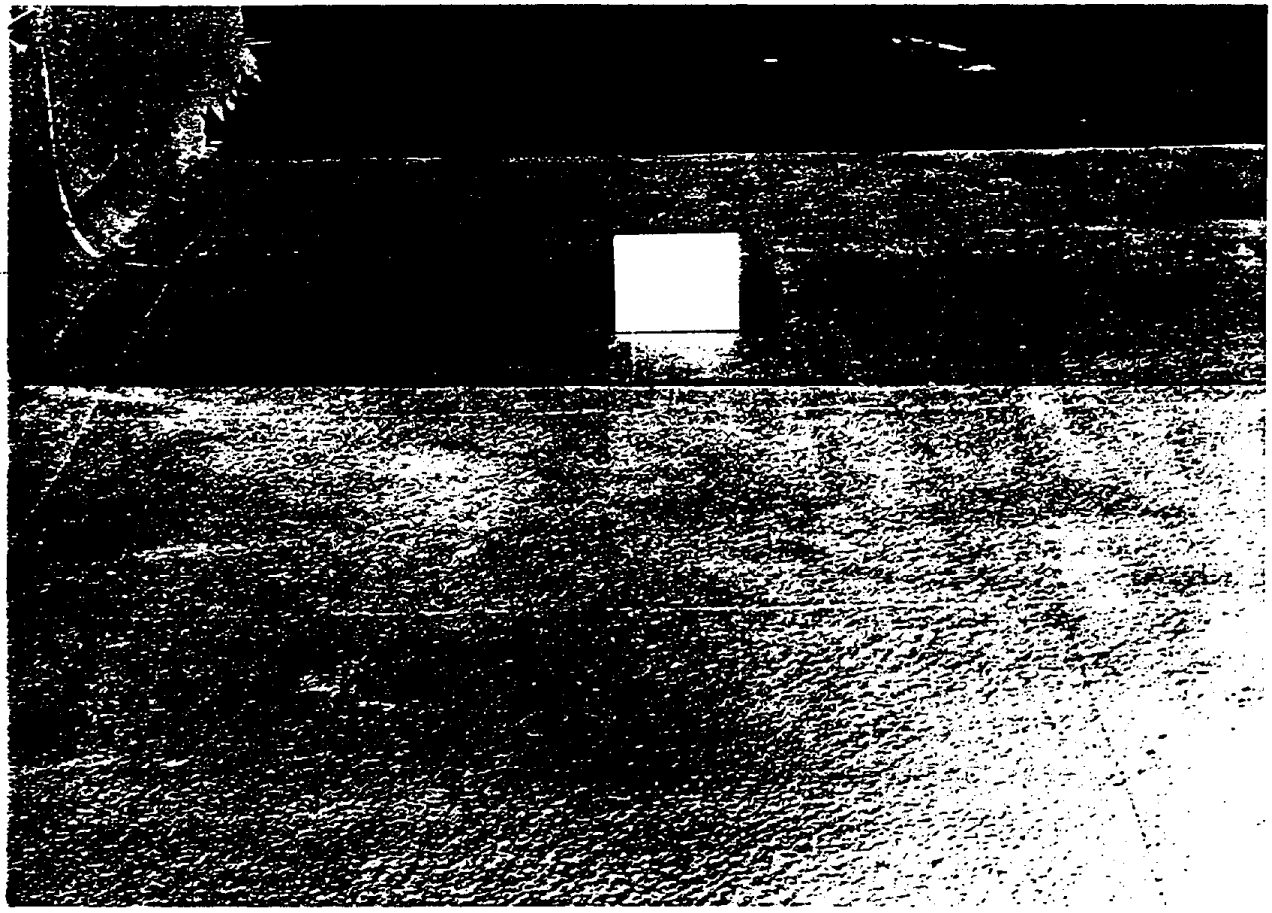


Primer test

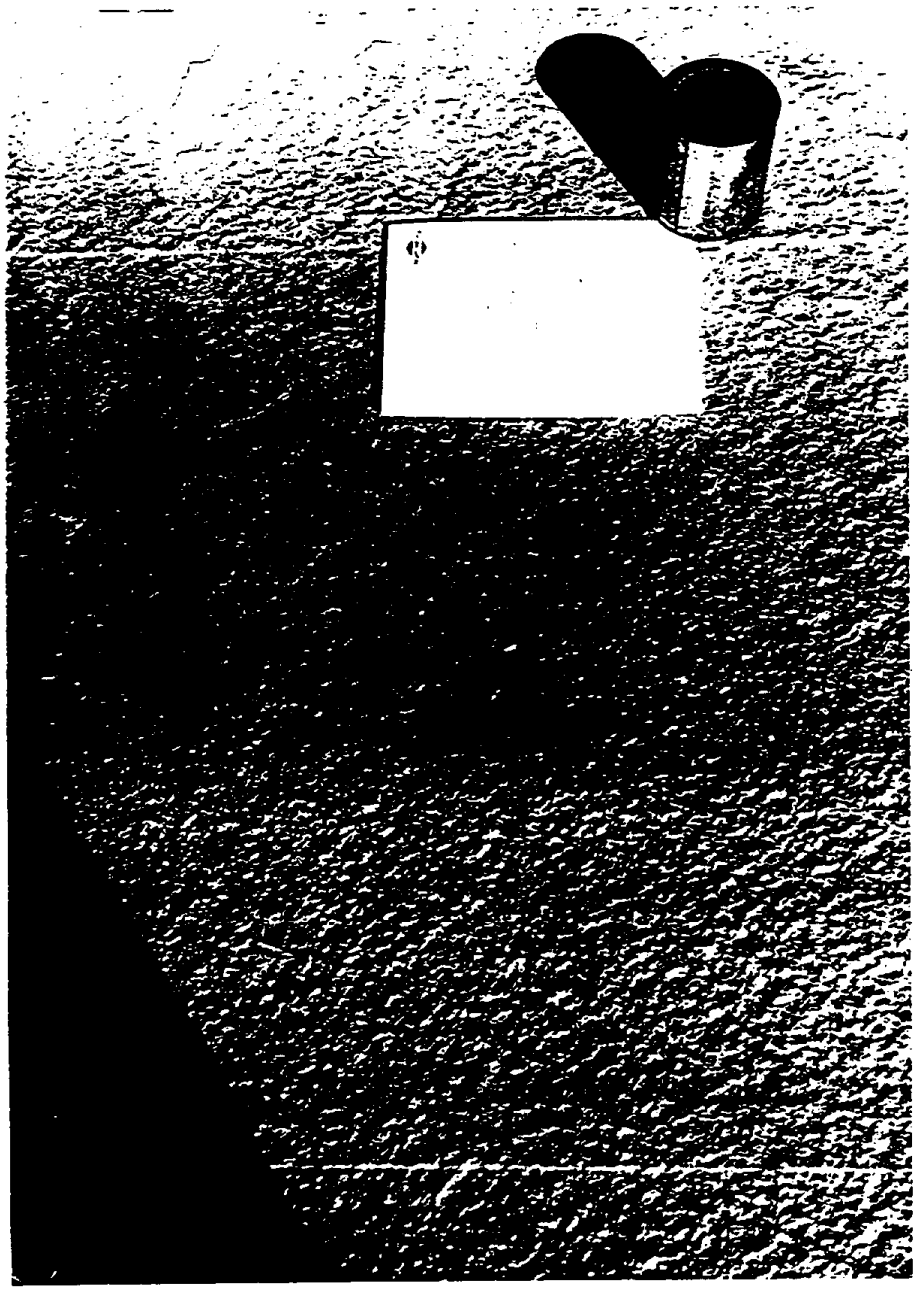
prim tot 4 v 11 far



prim tot 4 v 11 closeup



prim Est 3.5 far



print test 3 v 5 closeup

Henry COMPANY

13 March 2000

Mr. Jim Nyarady
California Air Resources Board
2020 L Street
Sacramento, CA 95812

Sent via e-mail to jnyarady@arb.ca.gov. with hardcopy via mail

Re: Proposed SCM VOC limit for asphaltic roof coatings

Dear Mr. Nyarady:

As we discussed in our meeting with the CARB staff on 18 January, solvent-based bituminous roof coatings provide a vital part of roof maintenance which can not be replaced by water-borne coatings. The VOC limit for such coatings in the proposed SCM is not adequate to
8b-1 permit a coating which can be applied at the low temperatures commonly found throughout the state. Because of weather limitations, water-borne (emulsion) roof coatings are not a substitute for solvent-borne coatings in many parts of the state for much of the year.

Purpose of Bituminous Roof Coatings

Bituminous roof coatings as a class provide a sacrificial coating which protects the waterproofing roof membrane from exposure to sunlight and air, thus significantly prolonging the life of the roof.

8b-2 Bituminous roof coatings are typically used as maintenance coatings rather than as part of a new roof system. In this role, solvent-borne and water-borne bituminous roof coatings function in different ways and accordingly are used differently.

Solvent-Borne Coatings

Solvent-borne coatings are chemically similar to the existing roof membrane. They penetrate a weathered bituminous roof membrane, sealing minor weathering damage and essentially solvent-weld themselves to the membrane. This leaves a new, durable top surface which is an integral part of the roof membrane.

Because they are solvent-based, these coatings are water resistant out of the can, and can be applied just before a rainfall if necessary.

2911 Slauson Avenue • Huntington Park, CA 90255
(323) 583-5000 • FAX (323) 582-6429 • www.henry.com

Solvent-borne coatings can be applied at almost any temperature. Since they are not water sensitive, they can be applied in cold weather and trusted to finish their cure without concern for the weather. For these reasons, solvent-borne coatings are often used to effect emergency repairs of weathered roofs.

Solvent-borne bituminous roof coatings are typically applied at 1.5 – 3 gallons per 100 square feet. We believe that most solvent-borne bituminous roof coatings are sold in 5 gallon pails to small contractors and Do-It-Yourselfers.

Water-borne (Emulsion) Coatings

8b-2

Water-borne asphaltic coatings can mechanically penetrate fine cracks, but do not affect the underlying membrane. They are held in place passively as an independent weather barrier. Emulsions, while durable in their own right, are also used as base coats for reflective coatings.

Because they are water dispersions, emulsions **must** be allowed to cure completely before being exposed to precipitation. Low temperatures and evening dew can prolong the cure of the coating substantially. For this reason they are typically applied only where warm, clear weather is predicted. Our recommended weather envelope is 50 °F and rising, with no dew, precipitation, or temperatures below 40 °F for 48 hours. These requirements leave much of California outside the safe application window for much of the year.

Emulsion roof coatings are typically applied at 3 – 5 gallons per 100 square feet. In our experience, because of the limitations on its use, much of the emulsion sold in California is sold in drums or totes to specialized contractors for use during warm weather.

Viscosity vs Temperature Data

Reducing the VOC content of a solvent-borne bituminous coating rapidly increases the viscosity, especially at cold temperatures.

Attached is an Excel spreadsheet ["CARB_coatings.xls"] which shows the viscosities of two different solvent-based asphalt roof coatings as a function of the VOC. The samples were generated by making a heavy production batch of each formula and then adding increments of solvent to the baseline material.

It is our experience that a roof coating can not be applied by brush (the usual method for solvent-borne coatings) if the viscosity is above ~80,000 centipoise. As you can see, only the two 350 g/l formulas provide this viscosities at 40 °F.

Failures of Water-borne Roof Coatings

Last January you asked whether we could document weather-related performance problems of water-borne roof coatings.

Attached are photographs of three different jobs which experienced weather-related failures last year. In all cases, the coatings were applied well outside of our recommended weather "envelope"; in all cases the contractor was trying to make some schedule commitment and gambled with the coating.

8b-2 The first photo ["frozen_emulsion"] is a close up of a coating applied last fall in northern California. The emulsion froze the first night when the weather dropped below 30 °F. The cracks in the coating go down to the membrane, and are already filling with dirt and water. This roof will have to be thoroughly cleaned and recoated next summer, when the weather permits.

The emulsion in second two photos ["K'ton AC unit" and "K'ton field area"] was applied to a cold (~40 °F) roof deck with the air temperature between 45 – 50 °F. That night, the temperature dropped below 40 °F and ~1/4" of rain fell. The photos, taken the next day, show that the emulsion washed off completely, exposing the polyester fabric below.

The third set of photos shows another roof in southern California ["Redlands_north" and "Redlands_east"]. During the week that the coating was applied, while the days were warm – typically above 65 °F – the roof froze at night. Light rain arrived the day after the coating shown was applied. This softened the coating in the low areas where the roof ponds, so that when a heavier rain arrived a few days later the emulsion washed out of the ponded areas, but not off the main area of the roof.

In all three cases, a solvent-borne coating would have survived the weather and remained on the roof, eventually curing into a permanent protective layer.

If you have any questions, please call me at (323) 908-5279. Note that this is a new direct-dial phone number.

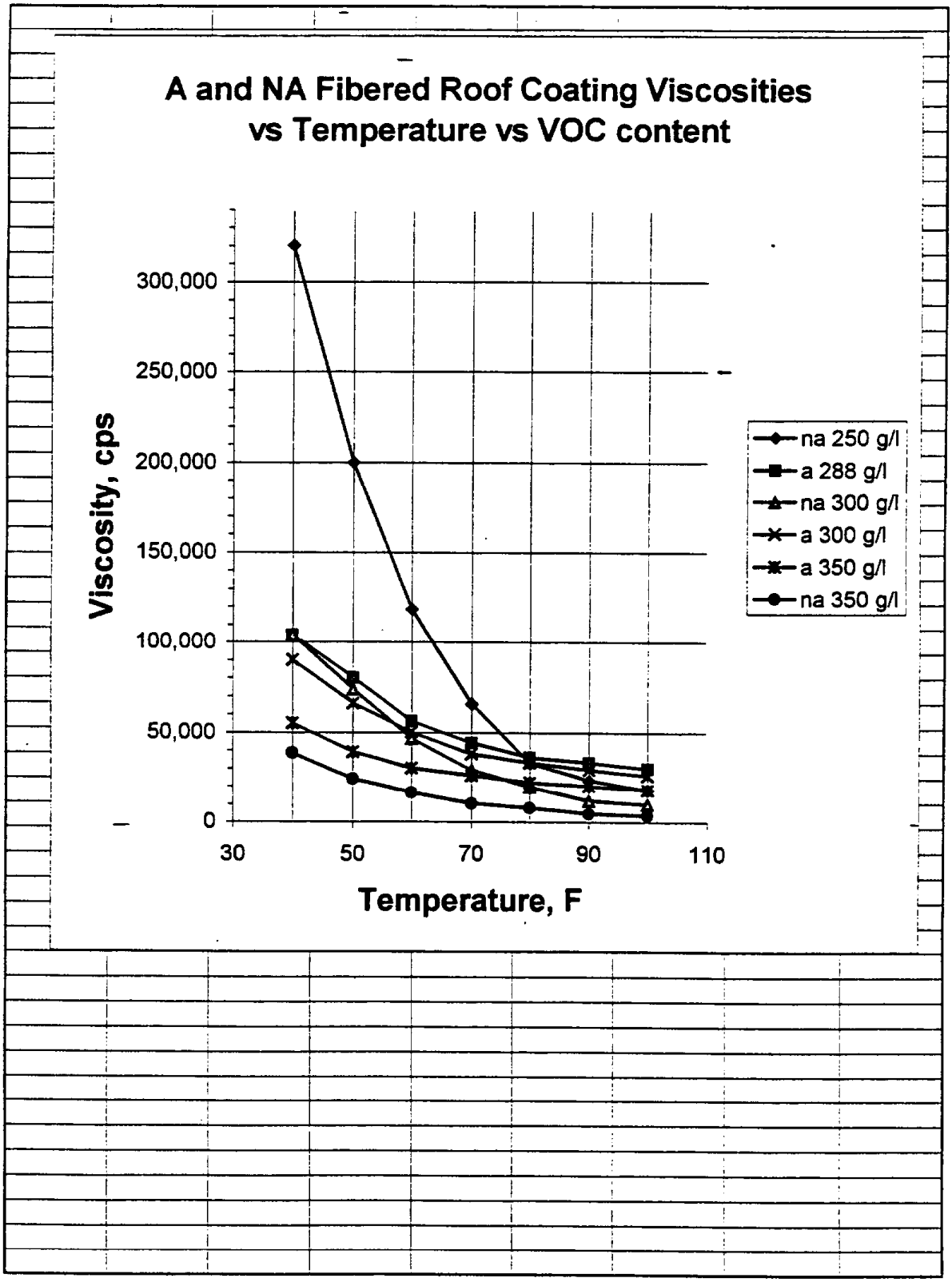
Paul A. Beemer

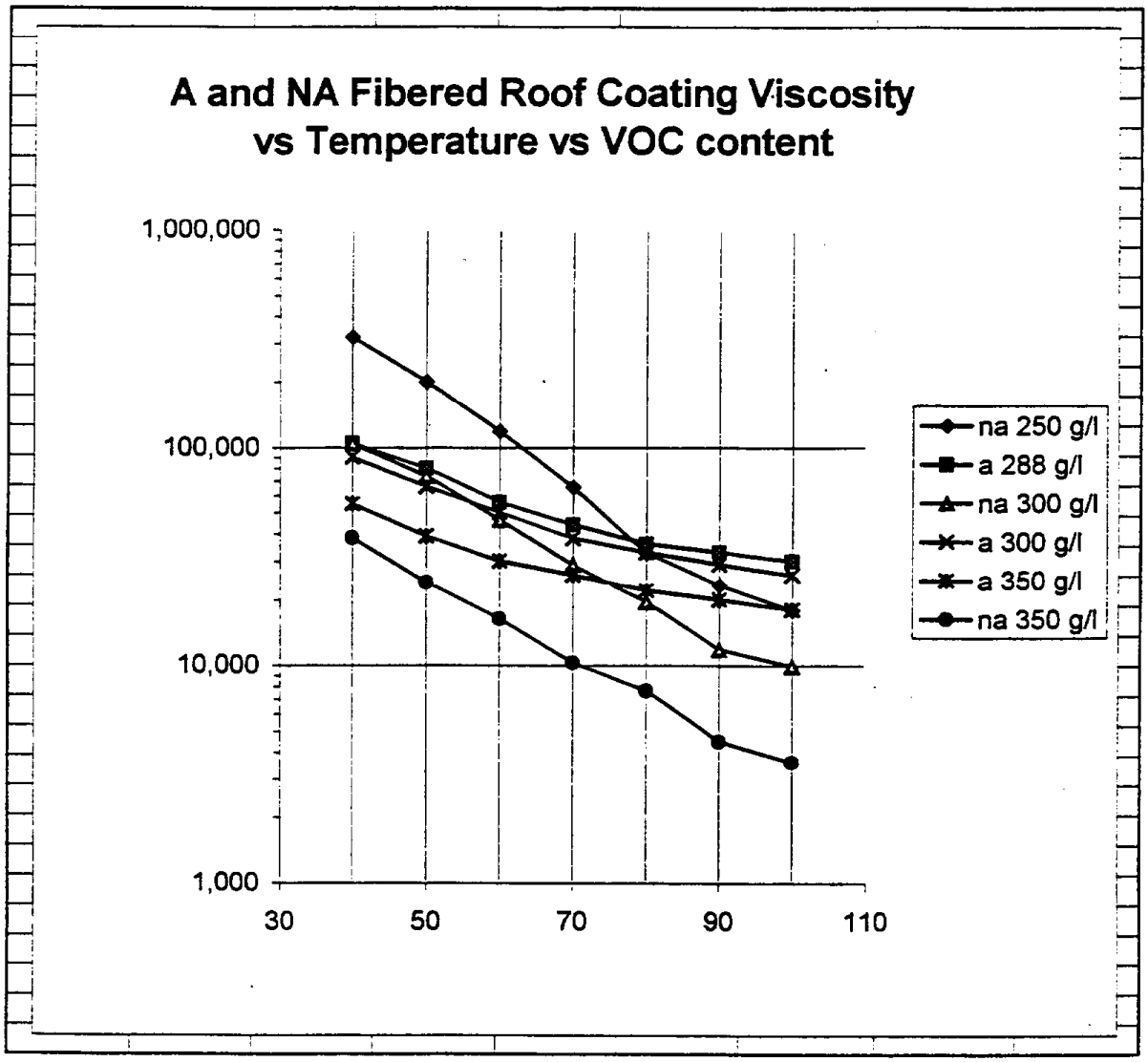
Paul A. Beemer
Technical Director, Coatings Division
Henry Company

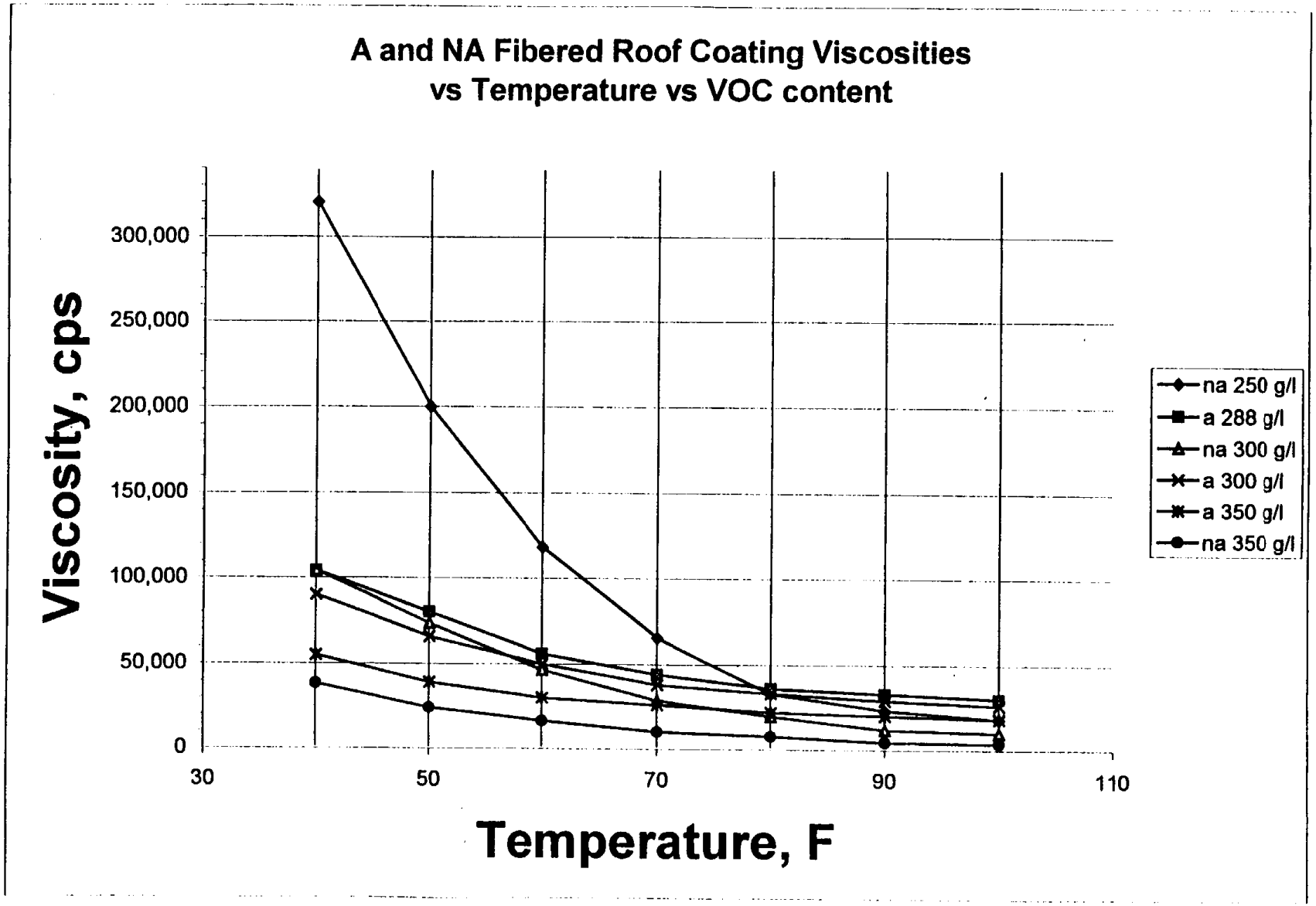
a and na Roof Coating Viscosity study at various temperatures - Brookfield HBT

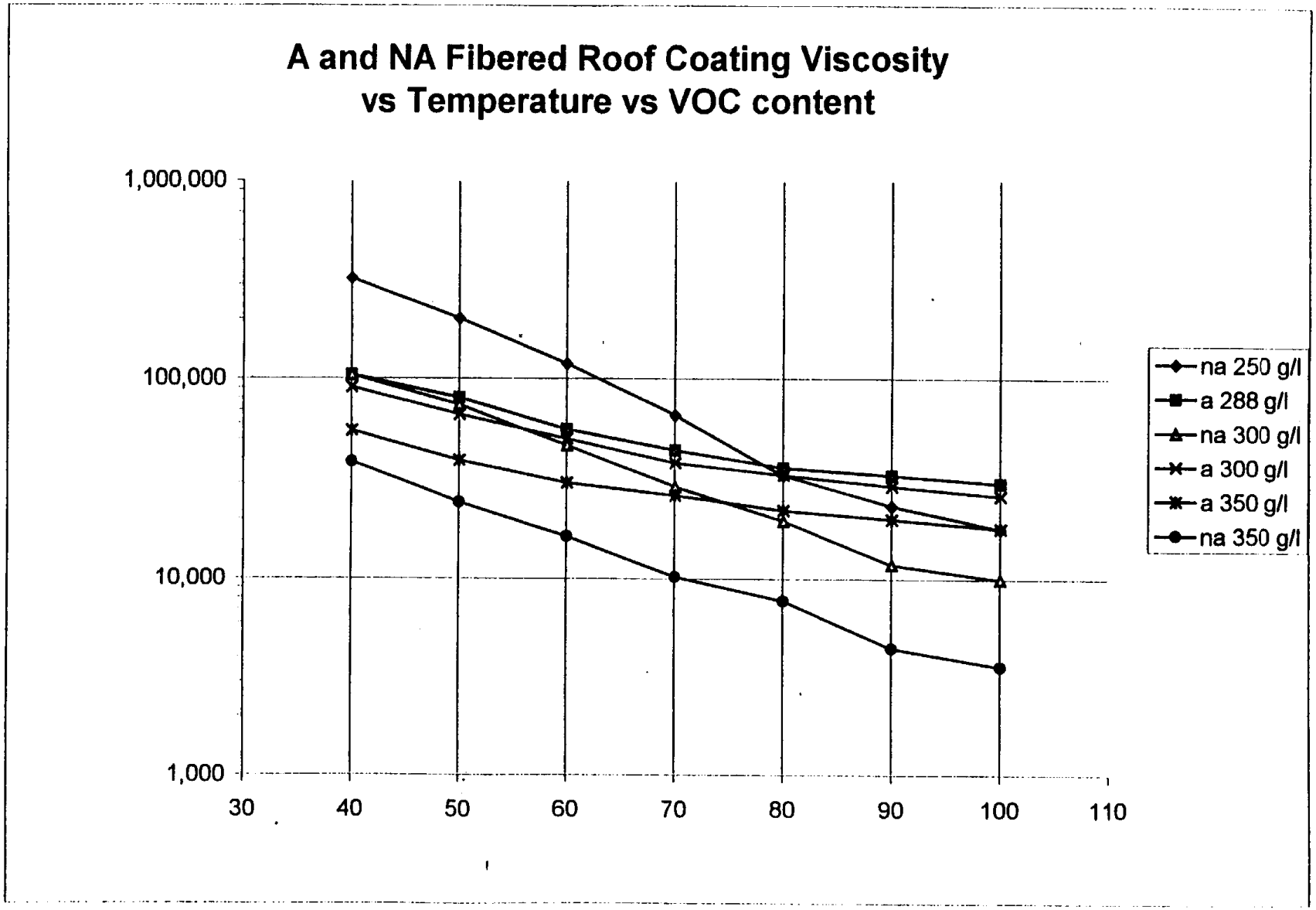
Master batch of each formula thinned in 2 steps to provide separate samples at 300 and 350 g/l

	Viscosity in CPS					
	na 250 g/l	**a 288 g/l**	**na 300 g/l**	**a 300 g/l**	**a 350 g/l**	**na 350 g/l**
40	320,000	104000	104,000	90000	55000	38,400
50	200,000	80000	73,600	66000	39000	24,000
60	118,400	56000	46,400	50000	30000	16,320
70	65,600	44000	28,800	38000	26000	10,240
80	32,800	36000	19,520	33000	22000	7,680
90	23,200	33000	11,840	29000	20000	4,480
100	17,920	30000	9,920	26000	18000	3,600


A and NA Fibered Roof Coating Viscosities
vs Temperature vs VOC content
Viscosity, cps
300,000
250,000
200,000
150,000
100,000
50,000
0
30
50
70
90
110
Temperature, F
na 250 g/l
a 288 g/l
na 300 g/l
a 300 g/l
a 350 g/l
na 350 g/l

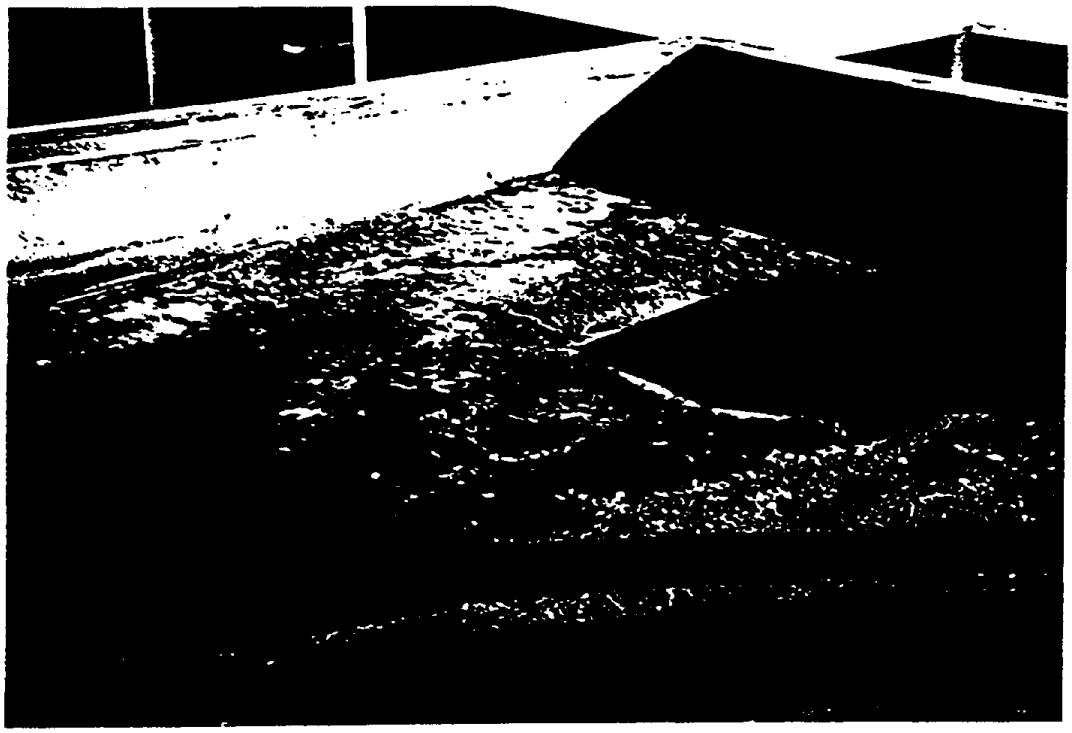

A and NA Fibered Roof Coating Viscosity
vs Temperature vs VOC content
1,000,000
100,000
10,000
1,000
30
50
70
90
110
na 250 g/l
a 288 g/l
na 300 g/l
a 300 g/l
a 350 g/l
na 350 g/l


A and NA Fibered Roof Coating Viscosities
vs Temperature vs VOC content
Viscosity, cps
300,000
250,000
200,000
150,000
100,000
50,000
0
30
50
70
90
110
Temperature, F
na 250 g/l
a 288 g/l
na 300 g/l
a 300 g/l
a 350 g/l
na 350 g/l


A and NA Fibered Roof Coating Viscosity
vs Temperature vs VOC content
1,000,000
100,000
10,000
1,000
30
40
50
60
70
80
90
100
110
na 250 g/l
a 288 g/l
na 300 g/l
a 300 g/l
a 350 g/l
na 350 g/l

frozen emulsion

Redlands north



Redlands west

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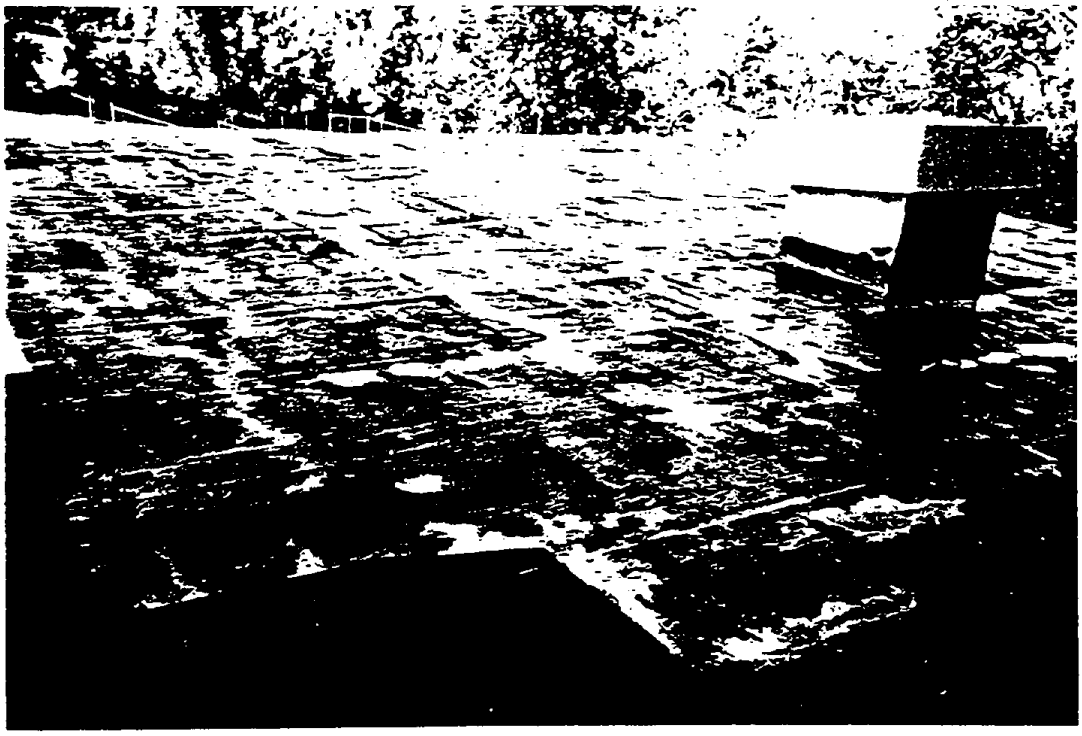
K'ton AC unit



K'ton field

The Sherwin-Williams Company
E-&RS Department 4 Midland
101 Prospect Avenue, N.W.
Cleveland, Ohio 44115-1075

BY FEDERAL EXPRESS NO. 8187-1626-1514

March 24, 2000

Ms. Barbara Fry
Manager, Measures Development Section
Stationary Source Division
Air Quality Measures Branch
California Air Resources Board
2020 L. Street
Sacramento, CA 95812

RE: Proposed Suggested Control Measure to Limit the Volatile Organic Compound Content of Architectural and Industrial Maintenance Coatings

Dear Ms. Fry,

9a-1 During the March 16, 2000 Workshop to discuss the proposed suggested control measure to limit the volatile organic compound content of architectural and industrial maintenance coatings, I mentioned that there were a number of errors in Appendix E of the Draft Program Environmental Impact Report. The attached Table provides the Corrections needed for the Sherwin-Williams products. Also enclosed are the appropriate Product Data Sheets. Where the Product Data Sheet is in error, I have also enclosed the Material Safety Data Sheet.

In addition to the VOC content errors found in Appendix E, there were also a number of products inappropriately included:

9a-2 1. Table E-8 Floor Coatings from 100 to 50 g/l
Benjamin Moore's Safety and Zone Marking Latex Paint is listed as a Floor coating (see the attached product description Attachment 1 from their website). It is obviously a traffic coating to be applied to streets, highways, parking lots, etc.

9a-3 2. Table E-2 Lacquers from 550 to 680 g/l
SHER-W00D® CAB-Acrylic Lacquer is for Industrial Use Only and is NOT for field application. Attachment 2 shows the summary product information available on the Sherwin-Williams website (www.sherwin.com). A representative label is attached.

SHER-W00D ® White CAB-Acrylic Lacquer is for Industrial Use Only and is NOT for field application. Attachment 3 shows the summary product information available on the Sherwin-Williams website (www.sherwin.com)

9a-4 3. Table E-3 Lacquers < 550 g/l
SHER-WOOD® KEM AQUA® Lacquer is for Industrial Use Only and is NOT for field application. Attachment 4 shows the summary product information available on the Sherwin-Williams website (www.sherwin.com). A representative label is attached.

Sherwin-Williams Polane® S Plus Polyurethane (which is probably meant to be Sherwin-Williams Polane® HS Plus Polyurethane since we do not have an "S" version) is for Industrial Use Only and is NOT for field application. Attachment 5 shows the summary product information available on the Sherwin-Williams website (www.sherwin.com). A representative label is attached.

9a-4

Because of these significant errors, Appendix D, Description and Technical Assessment of Coating Categories may need to be amended. A few examples of discussions that may now be in error are shown below:

Page D-6 lists properties used in marketing exterior flat coatings which comply with the proposed 100 g/l. The claim is made for "low temperature application to 35° F." That claim is the primary claim made for the Sherwin-Williams Low Temp 35 Latex Exterior Flat coating line. However, the VOC content of 59 g/l reported by CARB in *Table E-6: Flats < 100 g/l* is in error; the correct VOC content for this coating line ranges from 101 to 135 g/l. Unless other products on this table also make this claim, the list on page D-6 and the associated discussion will need to be amended.

9a-5

Page D-16 lists properties used in marketing interior low and medium gloss coatings which comply with the proposed 150 g/l. The claim is made for "alkyd-like flow and leveling." That is one of the key characteristics made for the Sherwin-Williams ProClassic® Waterborne Acrylic Semi-Gloss. However, the VOC content of 70 g/l reported by CARB in *Table E-14: Nonflats 150 – 50 g/l* is in error; the correct VOC content for this coating line is 157 g/l. Unless other products on this table also make this claim, the list on page D-6 and the associated discussion will need to be amended.

I hope this information is helpful and that these errors will be corrected in the Environmental Impact Report.

Additional comments on the Draft Program Environmental Impact Report will be forthcoming.

I am sorry that I was unable to send this to you sooner. My first day back in my office since the Workshop was on March 23, 2000.

Sincerely,

Madelyn K. Harding

Madelyn K. Harding, Administrator
Product Compliance & Registrations

CORRECTIONS NEEDED FOR SHERWIN-WILLIAMS PRODUCTS TO APPENDIX E TABLES

	Table	Table Title	Product	VOC (g/l) in Table	Correct VOC (g/l) Regulatory and
9a-6	E-6	Flats < 100 g/l	S-W EverClean® Latex Int. Flat	74	152-215
			S-W Low Temp 35™ Latex Ext. Flat	59	101-135
9a-7	E-11	Industrial Maintenace Ctgs. From 250 to 100 g/l	S-W Tank-Clad™ HS Epoxy (B62-80 series)	177 (catalyzed &	reduced 10%) = 249
9a-6	E-14	Nonflats from 150 to 50 g/l	S-W ProClassic® Waterborne Acrylic Semi-Gloss	70	157
			S-W ProClassic® Waterborne Acrylic Gloss	75	157
			S-W ProMar® 200 Interior Latex Gloss Enamel	90	155-195
			S-W SuperPaint® Ext. High Gloss Latex (A85)	57	105-130
			S-W EverClean® Int. Satin (A97)	81	186-220
9a-6	E-15	Nonflats 50 g/l or less	S-W LowTemp 35™ Ext Satin House Paint	40	101
			S-W A-100® Line - Satin (A82)	38	90-115
			S-W A-100® Line - Gloss (A8)	49	133-157
9a-6	E-17	Quick Dry Enamels - from 250 to 0 g/l	S-W ProClassic® Waterborne Acrylic Gloss	75	157
			S-W ProMar® 200 Latex Gloss Enamel	90	155-195
			also, does not meet 70 minimum at 60 degrees		
9a-8	E-20	Primer, Sealer, Undercoater - 100 g/l and less	S-W Loxon® Ext. Acrylic Masonry Primer	60	130
			S-W PrepRite™ 400	19	60
			S-W PrepRite™ 200	26	85
9a-9	E-25	Waterproofing Sealers - 250 g/l and less	S-W Cuprinol® Clear Deck Sealer	27	287

SHERWIN WILLIAMS®
www.sherwin-williams.com

EVERCLEAN®
INTERIOR LATEX FLAT
A96 SERIES

CHARACTERISTICS

EverClean® Interior Latex Flat is a specially formulated paint providing the washability and durability usually found in glossy enamel finishes. It allows most household stains to be removed without the need for scrubbing.

Color: Most ColorAnswers® colors
Coverage: 350 - 400 sq ft/gal @ 4 mils wet; 1.7 mils dry
Drying Time, @ 77°F, 50% RH: temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
Finish: 0-4 units @ 85°
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Extra White	0-4	special formulas
Pure White	0-4	special formulas
Midtone Base	4-8	100%
Luminous White	0-5	125%

Vehicle Type: Styrenated Acrylic
A96W24
VOC: 155 grams/liter; 1.29 lb/gal
Volume Solids: 42 ± 2%
Weight Solids: 61 ± 2%
Weight per Gallon: 12.3 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-29K
TT-P-1728A (cancelled)
TT-P-2119 Class I (cancelled)
A-A-2246 Type I & II, Class 1

SPECIFICATIONS

Aluminum
2 cts. EverClean Interior Latex Flat
Galvanized Steel
1 ct. All Surface Enamel Latex Primer
2 cts. EverClean Interior Latex Flat
Block
1 ct. PrepRite Block Filler
2 cts. EverClean Interior Latex Flat
Drywall
1 ct. PrepRite Classic Latex Primer
2 cts. EverClean Interior Latex Flat
Plaster
1 ct. PrepRite Classic Latex Primer
2 cts. EverClean Interior Latex Flat
Masonry
1 ct. PrepRite Masonry Primer
2 cts. EverClean Interior Latex Flat
Steel
1 ct. All Surface Enamel Primer
2 cts. EverClean Interior Latex Flat
Wood, Composition Board
1 ct. PrepRite Classic Latex Primer
2 cts. EverClean Interior Latex Flat

Mildew Resistant
This product contains agents which inhibit the growth of mildew on the surface of this paint film

WASHABILITY TEST —ASTM D3450-90
"Coating will retain, on average, greater than 80.0% reflectance after standardized soilant has been washed with either an abrasive or nonabrasive cleanser for 100 cycles when tested in accordance with ASTM D3450-90"

SURFACE PREPARATION

Remove all surface contamination by washing with ProClean Prep Wash Concentrated Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite ProBlock Primer Sealer.

Aluminum and Galvanized Steel
Wash with ProClean Prep Wash Concentrated Cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper or other abrading method.

Drywall
Fill cracks and holes with patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with PrepRite Masonry Primer.

Plaster
Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.

continued on back

101.01

EVERCLEAN®

INTERIOR LATEX FLAT

A96 SERIES

SURFACE PREPARATION

Steel
Rust and mill scale must be removed using sandpaper or other abrading method. Bare steel must be primed the same day as cleaned.

Wood
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth.

Mildew
Remove before painting by washing with ProClean Mildew Eliminator or a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking
Gaps between walls, ceilings, crown moldings, and other interior trim can be filled with Pro Select Premium Siliconized Acrylic Latex Caulk 1100A after priming the surface.

APPLICATION

Apply at temperatures above 50°F.
No reduction needed.
Brush
Use a nylon/polyester brush.
Roller
Use a 3/8" - 1/2" nap Soft Woven roller cover only.
Spray—Airless
Pressure ..... 2000 psi
Tip ..... .015"-.019"
For touching-up, reduce the product by one pint per gallon.

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. Flush spray equipment after cleaning with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

CARE AND WASHING INSTRUCTIONS

To assure maximum washability and durability, wait at least two weeks before washing the dry paint film. When removing stains, dirt, and marks, use a soft cloth or sponge with water, or use EverClean All Surface Cleaner or other general purpose household cleaner. Penetrating stains and marks can be removed either by applying a solution of household bleach in water and then rinsing with clean water; or, by carefully using an abrasive cleaner and water.

CAUTIONS

For interior use only.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS
CAUTION contains CRYSTALLINE SILICA. Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
7/99 LCE
11 00

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

SHERWIN WILLIAMS

LowTemp 35™

Exterior Latex Flat

B15 Series

CHARACTERISTICS

LowTemp 35 Exterior Latex Flat is a quality product recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and primed metal down to a surface and air temperature of 35°F.

Color: Exterior ColorAnswers colors
Coverage: 350 - 400 sq ft/gal @4 mils wet; 1.5 mils dry
Drying Time @ 50% RH: temperature and humidity dependent

	@ 35-45°F	@ 45-60°F
Touch:	2 hour	2 hours
Recoat:	24-48 hours	5 hours

Air and surface temperatures must not drop below 35°F for 48 hours after application.
Flash Point: 201°F, PMCC
Finish: 0-5 units @ 85°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy	4-8	100%

Vehicle Type: Acrylic

B15W210

VOC: 129 grams/liter; 1.08 lb/gal
Volume Solids: 40 ± 2%
Weight Solids: 57 ± 2%
Weight per Gallon: 11.7 lb

This product contains agents which inhibit the growth of mildew on the surface of this paint film.

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-19D
TT-E-2784A, Type III

SPECIFICATIONS

Latex primers cannot be used below 50°F. See specific primer label for that product's application conditions.

Two topcoats are recommended for all surfaces.

Substrate — **Primer**

Aluminum[1]
no primer necessary

Block
Loxon Block Surfacer

Brick
Masonry Conditioner
or ProMar Masonry Conditioner

Exterior Drywall
LowTemp 35 Exterior Latex Primer

Galvanized Steel[1]
no primer necessary

Masonry/Cement/Stucco
LowTemp 35 Exterior Latex Primer
Loxon Ext. Acrylic Masonry Primer[2]

Plywood
LowTemp 35 Exterior Latex Primer

Preprimed Metal Siding[1]
DTM Bonding Primer[2]

Steel, alkyd primer[1]
All Surface Enamel Oil Primer

Steel, latex primer[1]
All Surface Enamel Latex Primer[2]

Vinyl Siding
no primer necessary

Wood, Composition Board
LowTemp 35 Exterior Latex Primer

[1] On large expanses of metal siding, the air, surface, and material temperatures must be 50°F or higher.
[2] Not for use at temperatures under 50°F.

SURFACE PREPARATION

When the air temperature is at 35°F, substrates may be colder; prior to painting, check to be sure the **air, surface, and material temperature** are above 35°F and at least 5°F above the dew point. Avoid using if rain or snow is expected within 2-3 hours.
Remove all surface contamination by washing with ProClean All Surface Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite Quick Seal or A-100 Exterior Oil Wood Primer.

Aluminum and Galvanized Steel—Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Brick—Allow brick to weather at least one year followed by wire brushing to remove all efflorescence.

Exterior Drywall—Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block—All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

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LowTemp 35™

Exterior Latex Flat

B15 Series

SURFACE PREPARATION

Preprimed Metal Siding—(Florocarbon, Silicone Polyester, and Polyester Polymers) Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Steel—Remove rust and mill scale using sandpaper, steel wool, or other abrading method. Remove all sanding dust. Prime bare steel the same day as cleaned.

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl Siding—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Remove all sanding dust.

Mildew—Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Do not apply at air or surface temperatures below 35°F or when air or surface temperatures may drop below 35°F within 48 hours.

No reduction necessary.

Brush

Use a nylon/polyester brush.

Roller

Use a 3/8" - 3/4" nap synthetic cover.

Spray—Airless

Pressure ..... 2000 psi

Tip ..... .015"-.019"

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

LABEL ANALYSIS
B15W296

Pigment by Weight	37%
Titanium Dioxide	13%
Silicates	22%
Zinc Oxide	2%
Vehicle by Weight	63%
Acrylic Polymer	15%
Water	41%
Glycol/Esters	4%
Additives	3%
Total	100%

CAUTIONS

For exterior use only.

Protect from freezing.

Non-photochemically reactive.

Not for use on horizontal surfaces, such as a roof, deck, or floor, where water may collect.

On large expanses of prefinished metal siding, the air, surface, and material temperatures must be 50°F or higher.

LABEL CAUTIONS

CAUTION contains ZINC. Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. WARNING: This product contains a chemical known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.

LCE 9/20/99

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SHERWIN WILLIAMS

www.sherwin-williams.com

PROCLASSIC® WATERBORNE

INTERIOR ACRYLIC SEMI-GLOSS ENAMEL

B31 SERIES

CHARACTERISTICS

ProClassic® Waterborne Interior Acrylic Semi-Gloss Enamel provides a durable, non-yellowing, finish equal to an alkyd enamel. The superior flow and leveling characteristics result in a smooth, rich finish.

Project Uses

- all trim areas: moulding
- cabinets/doors/windows
- kitchen's/baths/locker rooms
- laundry rooms
- high traffic areas

Substrates

- drywall/plaster
- paneling/wood
- metal
- concrete/masonry
- wallcovering

Color: Most ColorAnswers® colors

Coverage: 350 - 400 sq ft/gal @ 4 mils wet; 1.3 mils dry

Drying Time, @ 77°F, 50% RH: temperature and humidity dependent

Touch:	1 hour
Recoat:	4 hours

Finish: 35-45 units @ 60°

Flash Point: 201°F, PMCC

Tinting with Blend-A-Color:

Base	oz/gal	Strength
Extra White	0-4	100%
Pure White	0-4	100%
Midtone Base	4-8	100%
Deeptone Base	8-12	100%
Luminous Base	0-4	100%

Vehicle Type: Styrene Acrylic

B31W21

VOC: 157 grams/liter; 1.31 lb/gal

Volume Solids: 35 ± 2%

Weight Solids: 49 ± 2%

Weight per gallon: 10.5 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification: AA-2246, Class 3

SPECIFICATIONS

Aluminum
2 cts. ProClassic Waterborne Interior Acrylic Semi-Gloss Enamel

Block
1 ct. PrepRite Block Filler
2 cts. ProClassic Waterborne Interior Acrylic Semi-Gloss Enamel

Drywall
1 ct. PrepRite Classic Latex Primer
2 cts. ProClassic Waterborne Interior Acrylic Semi-Gloss Enamel

Galvanized Steel
1 ct. All Surface Enamel Latex Primer
2 cts. ProClassic Waterborne Interior Acrylic Semi-Gloss Enamel

Plaster
1 ct. PrepRite Classic Latex Primer
2 cts. ProClassic Waterborne Interior Acrylic Semi-Gloss Enamel

Masonry
1 ct. PrepRite Masonry Primer
2 cts. ProClassic Waterborne Interior Acrylic Semi-Gloss Enamel

Steel
1 ct. All Surface Enamel Primer
2 cts. ProClassic Waterborne Interior Acrylic Semi-Gloss Enamel

Wood, Composition Board
1 ct. PrepRite Classic Latex Primer
2 cts. ProClassic Waterborne Interior Acrylic Semi-Gloss Enamel

SURFACE PREPARATION

Remove all surface contamination by washing with ProClean™ Prep Wash Concentrated Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite ProBlock Primer Sealer.

Aluminum and Galvanized Steel
Wash with ProClean Prep Wash Concentrated Cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper or other abrading method.

Drywall
Fill cracks and holes with patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with PrepRite Masonry Primer.

Plaster
Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.

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PROCLASSIC® WATERBORNE

INTERIOR ACRYLIC SEMI-GLOSS ENAMEL

B31 SERIES

SURFACE PREPARATION

Steel
Rust and mill scale must be removed using sandpaper, wire brush, or other abrading method. Remove all sanding dust. Bare steel must be primed the same day as cleaned. Although this product has some rust resistance, a separate rust inhibiting primer is recommended on bare steel.

Wood
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Remove all sanding dust.

Mildew
Remove before painting by washing with ProClean Mildew Eliminator or a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking
Gaps between walls, ceilings, crown moldings, and other interior trim can be filled with Pro Select Premium Siliconized Acrylic Latex Caulk 1100A after priming the surface.

LABEL ANALYSIS
B31W21

Pigment by Weight	26%
Titanium Dioxide	21%
Calcium Carbonate	5%
Vehicle by Weight	74%
Styrene Acrylic Resin	17%
Water	47%
Aliphatic Solvent	1%
Additives	9%
Total	100%

APPLICATION

Apply at temperatures above 50°F.
No reduction necessary.

Brush
Use a nylon/polyester brush.

Roller
Use a 1/4"-3/4" nap synthetic roller cover.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.021"
Tip for fine finishing	.011"

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

CARE AND WASHING INSTRUCTIONS

To assure maximum washability and durability, wait at least two weeks before washing the dry paint film. When removing stains, dirt, and marks, use a soft cloth or sponge with water, or use EverClean™ All Surface Cleaner or other general purpose household cleaner. Penetrating stains and marks can be removed either by applying a solution of household bleach in water and then rinsing with clean water; or, by carefully using an abrasive cleaner and water.

CAUTIONS

For interior use only.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS
CAUTION contains CRYSTALLINE SILICA. Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
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SHERWIN WILLIAMS

www.sherwin-williams.com

PROCLASSIC® WATERBORNE

INTERIOR ACRYLIC GLOSS ENAMEL

B21 SERIES

CHARACTERISTICS

ProClassic® Waterborne Interior Acrylic Gloss Enamel is a high quality water based enamel designed to provide service performance equal to high quality alkyd enamels.

Project Uses
- all trim areas and moulding
- cabinets/doors/windows
- kitchen's/baths/locker rooms
- laundry rooms
- high traffic areas

Substrates
- wood & metal
- drywall/plaster
- stucco
- concrete/masonry
- wallcovering

Color: Most ColorAnswers® Colors
Coverage: 350 - 400 sq ft/gal @ 4 mils wet; 1.3 mils dry
Drying Time, @ 77°F, 50% RH: temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Finish: 70 units @ 60°
Flash Point: 201°F, PMCC
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Extra White	0-4	100%
Pure White	0-4	100%
Luminous White	0-4	100%

Vehicle Type: Acrylic
B21W21
VOC: 157 grams/liter; 1.31 lb/gal
Volume Solids: 38 ± 2%
Weight Solids: 49 ± 2%
Weight per Gallon: 9.9 lb

SPECIFICATIONS

Aluminum
2 cts. ProClassic Waterborne Interior Acrylic Gloss Enamel

Block
1 ct. PrepRite Block Filler
2 cts. ProClassic Waterborne Interior Acrylic Gloss Enamel

Drywall
1 ct. PrepRite Classic Latex Primer
2 cts. ProClassic Waterborne Interior Acrylic Gloss Enamel

Galvanized Steel
1 ct. All Surface Enamel Latex Primer
2 cts. ProClassic Waterborne Interior Acrylic Gloss Enamel

Plaster
1 ct. PrepRite Classic Latex Primer
2 cts. ProClassic Waterborne Interior Acrylic Gloss Enamel

Masonry
1 ct. PrepRite Masonry Primer
2 cts. Interior Waterborne Semi-Gloss Enamel

Steel
1 ct. All Surface Enamel Primer
2 cts. ProClassic Waterborne Interior Acrylic Gloss Enamel

Wood, Composition Board
1 ct. PrepRite Classic Latex Primer
2 cts. ProClassic Waterborne Interior Acrylic Gloss Enamel

SURFACE PREPARATION

Remove all surface contamination by washing with ProClean™ Prep Wash Concentrated Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite ProBlock Primer Sealer.

Aluminum and Galvanized Steel
Wash with ProClean™ Prep Wash Concentrated Cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper or other abrading method.

Drywall
Fill cracks and holes with patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with PrepRite Masonry Primer.

Plaster
Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.

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PROCLASSIC® WATERBORNE

INTERIOR ACRYLIC GLOSS ENAMEL

B21 SERIES

SURFACE PREPARATION

Steel
Rust and mill scale must be removed using sandpaper, wire brush, or other abrading method. Remove all sanding dust. Bare steel must be primed the same day as cleaned. Although this product has some rust resistance, a separate rust inhibiting primer is recommended on bare steel.

Wood
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Remove all sanding dust.

Mildew
Remove before painting by washing with ProClean™ Mildew Eliminator or a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking
Gaps between walls, ceilings, crown moldings, and other interior trim can be filled with Pro Select™ Premium Siliconized Acrylic Latex Caulk 1100A after priming the surface.

APPLICATION

Apply at temperatures above 50°F.
No reduction necessary.

Brush
Use a nylon/polyester brush.

Roller
Use a quality 1/4" - 3/4" nap cover.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.021"
Tip for fine finishing	.011"

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

CARE AND WASHING INSTRUCTIONS

To assure maximum washability and durability, wait at least two weeks before washing the dry paint film. When removing stains, dirt, and marks, use a soft cloth or sponge with water, or use EverClean™ All Surface Cleaner or other general purpose household cleaner. Penetrating stains and marks can be removed either by applying a solution of household bleach in water and then rinsing with clean water; or, by carefully using an abrasive cleaner and water.

CAUTIONS

For interior use only.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
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LABEL ANALYSIS
B21W21

Pigment by Weight	24%
Titanium Dioxide	24%
Vehicle by Weight	76%
Styrene Acrylic Resin	21%
Water	45%
Aliphatic Solvent	2%
Glycol	3%
Additives	5%
Total	100%

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PROMAR® 200

INTERIOR LATEX GLOSS ENAMEL

B21 SERIES

CHARACTERISTICS

ProMar 200 Interior Latex Gloss Enamel is our finest quality product designed for the professional. This product is recommended for interior application on walls, ceilings, and trim of primed plaster, wallboard, wood, masonry, and primed metal.

Color: Most ColorAnswers® colors
Coverage:
Recommended: 400 sq ft/gal @4 mils wet; 1.5 mils dry
Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
Finish: 60-80 units @ 60°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Pure White	0-4	100%
Midtone Base	4-8	100%
Deeptone Base	8-12	100%
Luminous White	0-5	125%

Vehicle Type: Vinyl Acrylic
VOC (as packaged):
189 grams/liter; 1.5 lbs/gal
Volume Solids: 38 ± 2%
Weight Solids: 48 ± 2%
Weight per Gallon: 9.9 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-1511B, Type II

SPECIFICATIONS

Aluminum
2 cts. ProMar 200 Interior Latex Gloss Enamel
Galvanized Steel
1 ct. DTM Acrylic Primer/Finish
2 cts. ProMar 200 Interior Latex Gloss Enamel
Block
1 ct. PrepRite Block Filler
2 cts. ProMar 200 Interior Latex Gloss Enamel
Drywall
1 ct. PrepRite 200 Latex Primer
2 cts. ProMar 200 Interior Latex Gloss Enamel
Plaster
1 ct. PrepRite Wall and Wood Primer
2 cts. ProMar 200 Interior Latex Gloss Enamel
Masonry
1 ct. PrepRite Masonry Primer
or PrepRite Block Filler
2 cts. ProMar 200 Interior Latex Gloss Enamel
Steel, alkyd primer
1 ct. Kem Kromik Universal Metal Primer
2 cts. ProMar 200 Interior Latex Gloss Enamel
Steel, latex primer
1 ct. DTM Acrylic Primer/Finish
2 cts. ProMar 200 Interior Latex Gloss Enamel
Wood, Composition Board
1 ct. PrepRite Classic Latex Primer
or PrepRite Wall and Wood Primer
2 cts. ProMar 200 Interior Latex Gloss Enamel

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite ProBlock Primer Sealer.

Aluminum & Galvanized Steel
Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall
Fill cracks and holes with patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with PrepRite Masonry Primer.

Plaster
Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.

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PROMAR® 200

INTERIOR LATEX GLOSS ENAMEL

B21 SERIES

SURFACE PREPARATION

Steel
Rust and mill scale must be removed using sandpaper, steel wool or other abrading method. Bare steel must be primed the same day as cleaned.

Wood
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth.

Mildew - Remove before painting by washing with a solution of 1 quart liquid bleach and 3 quarts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.
Roller
No reduction necessary. Use a 1/4" - 3/4" nap synthetic roller cover.
Pad
No reduction necessary.
Spray—Airless
Pressure ..... 2000 psi
Tip ..... .017"-.021"
Reduction ..... none
Spray—Conventional
Air Pressure ..... 40-60 psi
Fluid Pressure ..... 20 psi
Cap/Tip 704/FX
Reduction ..... up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
B21W201

Pigment by Weight 17%
Titanium Dioxide 17%

Vehicle by Weight 83%
Vinyl Acrylic Resin 29%
Water 45%
Glycol/Alcohols/Esters 7%
Additives 2%

Total 100%

CAUTIONS

For interior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. WARNING: This product contains a chemical(s) known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB412

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SHERWIN WILLIAMS

SUPERPAINT®

EXTERIOR HIGH GLOSS LATEX ENAMEL

A85 SERIES

CHARACTERISTICS

SuperPaint Latex High Gloss Enamel

Recommended for:

- Doors
- Windows
- Trim
- Shutters

Use on:

- Wood
- Metal—Aluminum, Galvanized, Primed Steel
- Masonry, Cement, Brick, Block
- Stucco
- Vinyl trim, Shutters

Superior Performance in:

- Block Resistance
- Moisture Resistance
- Gloss Retention
- Flow and Leveling

Color: All exterior ColorAnswers colors

Coverage: 400 sq ft/gal @4 mils wet: 1.32 mils dry

Drying Time, @ 77°F, 50% RH: temperature and humidity dependent

Touch:	1 hour
Tack Free:	4 hours
Recoat:	24 hours

Flash Point: 201°F, PMCC

Finish: 70+ units @ 60°

Solvent/Reducer: Water

Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Red Base	4-8	100%
Neutral Base	8-12	100%
Package colors	0-4	not controlled

Vehicle Type: Acrylic

VOC (less exempt solvents): 118 grams/liter; 0.98 lbs/gal

Volume Solids: 43 ± 2%

Weight Solids: 54 ± 2%

Weight per Gallon: 10.3 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification: TT-E-2784A, Type I, Gloss

SPECIFICATIONS

Aluminum
1 ct. DTM Acrylic Primer/Finish
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Galvanized Steel
1 ct. DTM Acrylic Primer/Finish
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Steel
1 ct. Kem Kromik Universal Metal Primer
or DTM Acrylic Primer/Finish
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Vinyl
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Wood, Composition Board
1 ct. A-100 Exterior Oil Wood Primer
2 cts. SuperPaint Exterior High Gloss Latex Enamel

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull.

Aluminum & Galvanized Steel
Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall
Fill cracks and nail holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Steel
Rust and mill scale must be removed using sandpaper, steel wool or other abrading method. Bare steel must be primed the same day as cleaned.

Stucco
Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl
Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Continued on back

102.22

SUPERPAINT®

EXTERIOR HIGH GLOSS LATEX ENAMEL

A85 SERIES

SURFACE PREPARATION

Wood, Composition Board
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew - Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
A85W507

Pigment by Weight	15%
Titanium Dioxide	15%
Vehicle by Weight	85%
Acrylic Resin	48%
Styrene Acrylic	6%
Water	24%
Glycol	4%
Additives	3%
Total	100%

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.

Roller
No reduction necessary. Use a 3/8"-1/2" SherFab roller cover.

Spray—Airless

Pressure	2000 psi
Tip	.013"-.017"
Reduction	none

SuperPaint High Gloss Enamel sets up very quickly, providing painted surfaces which resists sticking together (blocking). When used at normal temperature and humidity, windows and doors can be closed after 4 hours drying. Maximum blocking resistance is achieved after 24 hours. With this benefit, some adjustments to your painting approach must be made.

- Do not paint in direct sun. Temperatures over 80°F and humidities under 30% will make the paint set up quicker.
- Do not over-work the product. Load paint on the surface, spread to cover, smooth out with long, even strokes. Finish this area before moving to a new area. Do not attempt to brush back into and further uniform an area once finished.
- Work quickly to maintain a wet edge.
- Paint objects in a vertical position to reduce the collection of airborne dirt and dust on the drying paint.

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.
Do not shake excessively.
Not for use on roofs, floors, or decks.
Do not use Red, Yellow, or Violet Blend-A-Color Toner for exterior use.

LABEL CAUTION
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.
WARNING: This product contains chemicals known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB528-4/98

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

SHERWIN WILLIAMS

www.sherwin-williams.com

EVERCLEAN®

INTERIOR LATEX SATIN

A97 SERIES

CHARACTERISTICS

EverClean® Interior Latex Satin is a specially formulated paint providing the washability and durability usually found in glossy enamel finishes. It allows most household stains to be removed without the need for scrubbing.

Color: Most ColorAnswers® colors
Coverage: 350 - 400 sq. ft./gal. @ 4 mils wet; 1.5 mils dry
Drying Time, @ 77°F, 50% RH: temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
Finish: 10-20 units @ 85°
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Extra White	0-4	special formulas
Pure White	0-4	special formulas
Midtone Base	4-8	100%
Luminous White	0-5	125%

Vehicle Type: Acrylic
A97W51
VOC: 186 grams/liter; 1.55 lb/gal
Volume Solids: 38 ± 2%
Weight Solids: 51 ± 2%
Weight per Gallon: 10.7 lb

Meets the performance requirements, not necessarily composition, of Federal Specification:
TT-P-2119, Class II

SPECIFICATIONS

Aluminum
2 cts. EverClean Interior Latex Satin
Galvanized Steel
1 ct. All Surface Enamel Latex Primer
2 cts. EverClean Interior Latex Satin
Block
1 ct. PrepRite Block Filler
2 cts. EverClean Interior Latex Satin
Drywall
1 ct. PrepRite Classic Primer
2 cts. EverClean Interior Latex Satin
Plaster
1 ct. PrepRite Classic Primer
2 cts. EverClean Interior Latex Satin
Masonry
1 ct. PrepRite Masonry Primer
2 cts. EverClean Interior Latex Satin
Steel
1 ct. All Surface Enamel Primer
2 cts. EverClean Interior Latex Satin
Wood, Composition Board
1 ct. PrepRite Classic Latex Primer
2 cts. EverClean Interior Latex Satin

Mildew Resistant
This product contains agents which inhibit the growth of mildew on the surface of this paint film

WASHABILITY TEST —ASTM D3450-90
"Coating will retain, on average, greater than 80.0% reflectance after standardized soilant has been washed with either an abrasive or nonabrasive cleanser for 100 cycles when tested in accordance with ASTM D3450-90"

SURFACE PREPARATION

Remove all surface contamination by washing with ProClean Prep Wash Concentrated Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite ProBlock Primer Sealer.

Aluminum and Galvanized Steel
Wash with ProClean Prep Wash Concentrated Cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper or other abrading method.

Drywall
Fill cracks and holes with patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with PrepRite Masonry Primer.

Plaster
Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.

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101.10

EVERCLEAN®

INTERIOR LATEX SATIN

A97 SERIES

SURFACE PREPARATION

Steel
Rust and mill scale must be removed using sandpaper or other abrading method. Bare steel must be primed the same day as cleaned.

Wood
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth.

Mildew
Remove before painting by washing with ProClean Mildew Eliminator or a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking
Gaps between walls, ceilings, crown moldings, and other interior trim can be filled with Pro Select Premium Siliconized Acrylic Latex Caulk 1100A after priming the surface.

APPLICATION

Apply at temperatures above 50°F.
No reduction needed.
Brush
Use a nylon/polyester brush.
Roller
Use a 3/8" - 1/2" nap Soft Woven roller cover only.
Spray—Airless
Pressure ..... 2000 psi
Tip ..... .015"-.019"
For touching-up, reduce the product by one pint per gallon.

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. Flush spray equipment after cleaning with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

CARE AND WASHING INSTRUCTIONS

To assure maximum washability and durability, wait at least two weeks before washing the dry paint film. When removing stains, dirt, and marks, use a soft cloth or sponge with water, or use EverClean All Surface Cleaner or other general purpose household cleaner. Penetrating stains and marks can be removed either by applying a solution of household bleach in water and then rinsing with clean water; or, by carefully using an abrasive cleaner and water.

CAUTIONS

For interior use only.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS
CAUTION contains CRYSTALLINE SILICA. Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
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The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

SHERWIN WILLIAMS

LOWTEMP 35™

EXTERIOR LATEX SATIN

B17 SERIES

CHARACTERISTICS

LowTemp 35 Exterior Latex Satin is a quality product recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and primed metal down to a surface and air temperature of 35°F.

Color: Exterior ColorAnswers colors
Coverage: 350 - 400 sq ft/gal @ 4 mils wet; 1.3 mils dry
Drying Time @ 50% RH: temperature and humidity dependent

	@ 35-45°F	@ 45-60°F
Touch:	2 hours	2 hours
Recoat:	48 hours	5 hours

Air and surface temperatures must not drop below 35°F for 48 hours after application.

Flash Point: 201°F, PMCC
Finish: 10-20 units @ 60°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy	4-8	100%

Vehicle Type: Acrylic
B17W410
VOC: 102 grams/liter; 0.85 lb/gal
Volume Solids: 35 ± 2%
Weight Solids: 47 ± 2%
Weight per Gallon: 10.3 lb

This product contains agents which inhibit the growth of mildew on the surface of this paint film.

Provides performance which is comparable to the products that are formulated in accordance with federal specification: TT-P-19D

SPECIFICATIONS

Latex primers cannot be used below 50°F. See specific primer label for that product's application conditions.

Two topcoats are recommended for all surfaces.

Substrate — **Primer**

Aluminum[1]
no primer necessary

Block
Loxon Block Surfacer

Brick
Masonry Conditioner
or ProMar Masonry Conditioner

Exterior Drywall
LowTemp 35 Exterior Latex Primer

Galvanized Steel[1]
no primer necessary

Masonry/Cement/Stucco
LowTemp 35 Exterior Latex Primer
Loxon Ext. Acrylic Masonry Primer[2]

Plywood
LowTemp 35 Exterior Latex Primer

Preprimed Metal Siding[1]
DTM Bonding Primer[2]

Steel, alkyd primer[1]
All Surface Enamel Oil Primer

Steel, latex primer[1]
All Surface Enamel Latex Primer[2]

Vinyl Siding
no primer necessary

Wood, Composition Board
LowTemp 35 Exterior Latex Primer

[1] On large expanses of metal siding, the air, surface, and material temperatures must be 50°F or higher.
[2] Not for use at temperatures under 50°F.

SURFACE PREPARATION

When the air temperature is at 35°F, substrates may be colder; prior to painting, check to be sure the **air, surface, and material temperature** are above 35°F and at least 5°F above the dew point. Avoid using if rain or snow is expected within 2-3 hours.
Remove all surface contamination by washing with ProClean All Surface Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite Quick Seal or A-100 Exterior Oil Wood Primer.

Aluminum and Galvanized Steel—Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Brick—Allow brick to weather at least one year followed by wire brushing to remove all efflorescence.

Exterior Drywall—Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block—All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

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102.13

LowTemp 35™

Exterior Latex Satin

B17 Series

SURFACE PREPARATION

Preprimed Metal Siding—(Florocarbon, Silicone Polyester, and Polyester Polymers) Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Steel—Remove rust and mill scale using sandpaper, steel wool, or other abrading method. Remove all sanding dust. Prime bare steel the same day as cleaned.

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl Siding—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Remove all sanding dust.

Mildew—Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Do not apply at air or surface temperatures below 35°F or when air or surface temperatures may drop below 35°F within 48 hours.

No reduction necessary.

Brush

Use a nylon/polyester brush.

Roller

Use a 3/8" - 3/4" nap synthetic cover.

Spray—Airless

Pressure ..... 2000 psi

Tip ..... .015"-.019"

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

CAUTIONS

For exterior use only.

Protect from freezing.

Non-photochemically reactive.

Not for use on horizontal surfaces, such as a roof, deck, or floor, where water may collect.

On large expanses of prefinished metal siding, the air, surface, and material temperatures must be 50°F or higher.

LABEL CAUTIONS

CAUTION contains CRYSTALLINE SILICA and ZINC. Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.

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102.11

A-100®

EXTERIOR LATEX SATIN
A82 SERIES

CHARACTERISTICS

A-100 Exterior Latex Satin is our best quality exterior satin finish. This product is recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: All Exterior ColorAnswers® colors
Coverage:
Recommended: 400 sq ft/gal @ 4 mils wet; 1.3 mils dry
Drying Time, @77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
Finish: 10-20 units @ 60°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy Base	4-8	100%
Package Colors	0-4	not controlled

Vehicle Type: Acrylic
VOC (less exempt solvents):
38 grams/liter; 0.32 lb/gal
Volume Solids: 33 ± 2%
Weight Solids: 47 ± 2%
Weight per Gallon: 10.4 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-19D
TT-P-96D (cancelled)
TT-P-1510A (cancelled)

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. A-100 Exterior Latex Satin
Block
1 ct. PrepRite Block Filler
2 cts. A-100 Exterior Latex Satin
Brick
1 ct. Masonry Conditioner
or Loxon Conditioner
2 cts. A-100 Exterior Latex Satin
Cement Composition Siding/Panels
1 ct. Loxon Ext. Acrylic Masonry Primer
or Loxon Conditioner
2 cts. A-100 Exterior Latex Satin
Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Latex Satin
Galvanized Steel
2 cts. A-100 Exterior Latex Satin
Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. A-100 Exterior Latex Satin
Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Latex Satin
Steel
1 ct. Kem Kromik Universal Metal Primer
or DTM Acrylic Primer/Finish
2 cts. A-100 Exterior Latex Satin
Vinyl Siding
2 cts. A-100 Exterior Latex Satin
Wood, Composition Board
1 ct. A-100 Exterior Oil Wood Primer
2 cts. A-100 Exterior Latex Satin

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with PrepRite ProBlock Primer Sealer.

Aluminum & Galvanized Steel— Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall— Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Cement Composition Siding/Panels
Clean thoroughly. Do not pressure wash, the pressure may damage the panels. Allow the surface to dry thoroughly. Prime bare panels with an acrylic primer.

Steel— Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

continued on back

102.11

A-100®

EXTERIOR LATEX SATIN
A82 SERIES

SURFACE PREPARATION

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Plywood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew—Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.
Roller
No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.
Pad
No reduction necessary.
Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
A82W510

Pigment by Weight	25%
Titanium Dioxide	20%
Zinc Oxide	2%
Silica/Silicates	3%
Vehicle by Weight	75%
Acrylic Resin	20%
Water	49%
Additives	6%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS
Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB98

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SHERWIN WILLIAMS

102.21

A-100®

EXTERIOR GLOSS LATEX

A8 SERIES

CHARACTERISTICS

A-100 Exterior Latex Gloss is our best quality exterior gloss finish. This product is recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: All Exterior ColorAnswers® colors
Coverage:
Recommended: 400 sq ft/gal @4 mils wet; 1.3 mils dry
Drying Time, @77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 24 hours
Flash Point: 201°F, PMCC
Finish: 35-45 units @ 60°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
BaseA, B, C	4-8	100%
Burgundy Base	4-8	100%
Package Colors	0-4	not controlled

Vehicle Type: Acrylic
VOC (as packaged):
132 grams/liter; 1.06 lbs/gal
Volume Solids: 33 ± 2%
Weight Solids: 44 ± 2%
Weight per Gallon: 10.0 lb

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. A-100 Exterior Gloss Latex
Block
1 ct. PrepRite Block Filler
2 cts. A-100 Exterior Gloss Latex
Brick
1 ct. Masonry Conditioner
or ProMar Masonry Conditioner
2 cts. A-100 Exterior Gloss Latex
Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Gloss Latex
Galvanized Steel
2 cts. A-100 Exterior Gloss Latex
Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. A-100 Exterior Gloss Latex
Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Gloss Latex
Steel, alkyd primer
1 ct. Kem Kromik Universal Metal Primer
2 cts. A-100 Exterior Gloss Latex
Steel, latex primer
1 ct. DTM Acrylic Primer/Finish
2 cts. A-100 Exterior Gloss Latex
Vinyl Siding
2 cts. A-100 Exterior Gloss Latex
Wood, Composition Board
1 ct. A-100 Exterior Oil Wood Primer
2 cts. A-100 Exterior Gloss Latex

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with PrepRite ProBlock Primer Sealer.

Aluminum & Galvanized Steel—Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall—Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Steel—Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

Continued on back

102.21

A-100®

EXTERIOR GLOSS LATEX
A8 SERIES

SURFACE PREPARATION

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Plywood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew—Remove before painting by washing with a solution of 1 quart liquid bleach and 3 quarts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.
Roller
No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.
Pad
No reduction necessary.
Spray—Airless

Pressure	2000 psi
Tip	.019" - .021"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
A8W16

Pigment by Weight	19%
Titanium Dioxide	17%
Zinc Oxide	2%
Vehicle by Weight	81%
Acrylic Resin	23%
Water	52%
Glycol/Alcohol/Esters	4%
Mildewcide	0.2%
Additives	1.8%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS
Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB98

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

— Section 1 —
Product Identification

Material Safety Data Sheet

The Sherwin-Williams Co.
101 Prospect Ave. N.W.
Cleveland, OH 44115

Emergency telephone number (216) 566-2917
Information telephone number (216) 566-2902
Date of preparation March 1, 1998

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Latex Exterior Finishes - A-100® Latex Exterior Finishes

LE/3

— Section 2 — CAS No. Hazardous Ingredients (percent by weight)	ACGIH TLV <STEL>	OSHA PEL <STEL>	Units	Vapor Pressure (mm Hg)	FLAT	SATIN	GLOSS	EXT. WOOD PRIMER
					A6 B 550 Tricorn Black A6 W 16 White A6 G 514 Base C A6 W 501 Perma White A6 N 507 Chateau Brown A6 W 515 Base A A6 N 556 Plantation Brown A6 W 520 UltraDeep (A6 R 503) Rustic Red A6 W 596 Tinting White A6 Y 554 Yellow Corn A6 Y 516 Base B A6 R 533 Burgundy	A82 B 550 Tricorn Black A82 W 510 White A82 G 514 Base C A82 W 515 Base A A82 N 507 Chateau Brown A82 W 596 Tinting White A82 N 556 Plantation Beige A82 Y 516 Base B A82 R 533 Burgundy A82 Y 554 Yellow Corn A82 W 501 Perma White	A8 B 512 Tricorn Black A8 W 524 Perma White A8 G 531 Base C A8 W 525 Tinting White A8 N 503 Plantation Brown A8 W 541 Base A A8 N 515 Chateau Brown A8 Y 520 Yellow Corn A8 R 533 Burgundy Base A8 Y 558 Base B A8 W 16 White	B42 W 41 Wood Primer
107-21-1 § Ethylene Glycol.	C 50	50	PPM	0.1	0 - 4	< 3% may be added due to tinting		2
112-34-5 § 2-(2-Butoxyethoxy)-ethanol	Not Established			0.1			1 - 2	1
64742-54-7 Heavy Paraffinic Oil.	5	5	Mg/M3	as Mist		1 in Tricorn Black only	1 in Base C only	
14808-60-7 Quartz	0.1	0.1	Mg/M3	as Resp. Dust	6 - 24	0.0 - 0.1		0.2
14464-46-1 Cristobalite	0.05	0.05	Mg/M3	as Resp. Dust	1 - 2	0.5 - 2	0.1 - 0.8	2
1332-58-7 Kaolin	2	5	Mg/M3	as Resp. Dust	Numbers In Boxes Are Percent By Weight	2 - 4	0 - 2	
14807-96-6 Talc	2	2	Mg/M3	as Resp. Dust				7
13463-67-7 Titanium Dioxide.	10	10[5]	Mg/M3 [Resp. Fraction]	as Dust	0 - 18	0 - 19	0 - 17	15
1314-13-2 Zinc Oxide	10	10[5]	Mg/M3 [Resp. Fraction]	as Dust	0 - 2	0 - 3	0 - 2	
1333-86-4 Carbon Black.	3.5	3.5	Mg/M3		0 - 2	0 - 2	0 - 2	
§ Antimony Compound. [% Antimony]					8 [1.0] in Yellow Corn only	8 [1.0] in Yellow Corn only	8 [1.0] in Yellow Corn only	
§ Nickel Compound. [% Nickel]					8 [0.3] in Yellow Corn only	8 [0.3] in Yellow Corn only	8 [0.3] in Yellow Corn only	
§ Zinc Compound. [% Zinc]					0 [0.0] - 2 [2.0]	0 [0.0] - 3 [2.0]	0 [0.0] - 2 [1.7]	
Weight per Gallon (lbs.)					10.0 - 11.1	8.9 - 10.4	8.8 - 10.0	10.9
Percent Water					46.7 - 54.5	49.9 - 59.5	51.2 - 58.0	45.3
VOC (Volatile Organic Compounds) Total - lbs./gal.					0.3 - 0.5	0.3 - 0.3	0.4 - 0.5	0.4
VOC Less Water & Federally Exempt Solvents - lbs./gal.					0.8 - 1.3	0.8 - 0.9	1.1 - 1.3	1.0
Flash Point (°F) / HMIS (NFPA) Rating (health - flammability - reactivity)					None 2* - 0 - 0	None 2*0 0 -	None 2* - 0 - 0	None 2* - 0 - 0

Section 3 —Physical Data

PRODUCT WEIGHT	See TABLE	*EVAPORATION RATE*	Slower than Ether
SPECIFIC GRAVITY	1.05-1.41	*VAPOR DENSITY*	Heavier than Air
BOILING RANGE	212-477 °F	*MELTING POINT*	N.A.
VOLATILE VOLUME	57-75 %	*SOLUBILITY IN WATER*	N.A.
pH	8.5-9.5	*PHOTOCHEMICALLY REACTIVE*	No

Section 4 — Fire And Explosion Hazard Data

FLAMMABILITY CLASSIFICATION *FLASH POINT* Not Applicable *LEL* N.Ap. *UEL* N.Ap.
Not Applicable
EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Alcohol Foam
UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.
SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Section 5 —Health Hazard Data

ROUTES OF EXPOSURE
Exposure may be by INHALATION and/or SKIN or EYE contact, depending on conditions of use. To minimize exposure, follow recommendations for proper use, ventilation, and personal protective equipment.
ACUTE Health Hazards
EFFECTS OF OVEREXPOSURE
Irritation of eyes, skin and upper respiratory system. In a confined area vapors in high concentration may cause headache, nausea or dizziness.
SIGNS AND SYMPTOMS OF OVEREXPOSURE
Redness and itching or burning sensation may indicate eye or excessive skin exposure.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
None generally recognized.
EMERGENCY AND FIRST AID PROCEDURES
If INHALED: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
If on SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.
If in EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
If SWALLOWED: Get medical attention.
CHRONIC Health Hazards
Crystalline Silica (Quartz, Cristobalite) is listed by IARC and NTP. Long term exposure to high levels of silica dust, which can occur only when sanding or abrading the dry film, may cause lung damage (silicosis) and possibly cancer.
Carbon Black is classified by IARC as possibly carcinogenic to humans (group 2B) based on experimental animal data, however, there is insufficient evidence in humans for its carcinogenicity.
Ethylene Glycol is considered an animal teratogen. It has been shown to cause birth defects in rats and mice at high doses when given in drinking water or by gavage. There is no evidence to indicate it causes birth defects in humans.
Prolonged overexposure to solvent ingredients in Section II may cause adverse effects to the liver and urinary systems.
Rats exposed to titanium dioxide dust at 250 mg./m3 developed lung cancer, however, such exposure levels are not attainable in the workplace.

Section 6 — Reactivity Data

STABILITY – Stable
CONDITIONS TO AVOID
None known.
INCOMPATIBILITY
None known.
HAZARDOUS DECOMPOSITION PRODUCTS
By fire: Carbon Dioxide, Carbon Monoxide
HAZARDOUS POLYMERIZATION – Will Not Occur

Section 7 — Spill Or Leak Procedures

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate and remove with inert absorbent.
WASTE DISPOSAL METHOD
Waste from these products is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section 8 — Protection Information

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation. Avoid breathing vapor and spray mist. Avoid contact with skin and eyes. Wash hands after using.
These coatings may contain materials classified as nuisance particulates (listed "as Dust" in Section II) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section II, the applicable limits for nuisance dusts are ACGIH TLV 10 mg./m3 (total dust), 3 mg./m3 (respirable fraction), OSHA PEL 15 mg./m3 (total dust), 5 mg./m3 (respirable fraction).
VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section II is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.
RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section II.
When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.
PROTECTIVE GLOVES
Wear gloves which are recommended by glove supplier for protection against materials in Section II.
EYE PROTECTION
Wear safety spectacles with unperforated sideshields.

Section 9 — Precautions

DOL STORAGE CATEGORY – Not applicable
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

Section 10 — Other Regulatory Information

CALIFORNIA PROPOSITION 65
WARNING: A6B550, A6G514, A6N507, A6N556, A6W16, A6W501, A6W515, A6W520, A6W596, A6Y516, A16G203, A16R201, A16W200, A16W201, A16Y202, A80B512, A80G503, A80N510, A80N511, A80W501, A80W506, A80W507, A80Y502, A82B550, A82G514, A82N507, A82N556, A82W501, A82W510, A82W515, A82W596, A82Y516, A85B512, A85R530, A85W501, A85W506, A85W507, A89B512, A89G503, A89N511, A89W501, A89W506, A89W507, A89Y502, B15B250, B15W201, B15W215, B15W296, B17B450, B17G414, B17W415, B17W496, B17Y416, B42W41, C1W501 and C1W502 contain a chemical known to the State of California to cause cancer.
A6R503, A6R533, A6Y554, A8B512, A8G513, A8N503, A8N515, A8R533, A8W16, A8W524, A8W525, A8W541, A8W502, A8Y558, A16R233, A80Y508, A80R533, A82R533, A82Y554, A84B512, A84G503, A84N510, A84N511, A84R533, A84W501, A84W506, A84W507, A84Y502, A84Y508, A85G503, A85R533, A85T504, A85Y502, A89N510, A89R533, A89Y508, B15G214, B15R233, B15Y216, B17R433, B17W410, B22G100, B22N102, B22R101, B22R133, B22W101, B22W102, B22Y100, B36G300, B36R533, B36W300, B36W301, B36W302, B36W306, B36Y300, B36Y304, B77G500, B77R533, B77W501, B77W502, B77W506, and B77Y500 contain chemicals known to the State of California to cause cancer.

TSCA CERTIFICATION
All chemicals in these products are listed, or are exempt from listing, on the TSCA Inventory.

The above information pertains to these products as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to these products may substantially alter the composition and hazards of these products. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

SHERWIN WILLIAMS®

Industrial and Marine Coatings

NSF®

Certified to ANSI/NSF 61

4.79

TANK CLAD HS

PART A	B62W80	SANITARY WHITE
PART A	B62L80	LIGHT BLUE
PART B	B60V80	HARDENER

PRODUCT INFORMATION

Revised 1/2000

PRODUCT DESCRIPTION

TANK CLAD HS is a VOC compliant, 80% solids epoxy coating formulated specifically as an interior lining for pipes and tanks containing potable water, fresh water, and salt water. May also be used as part of a system for tank exteriors.

- NSF approved to Standard 61 for potable water (tanks 60,000 gallons and larger)
- Suitable for use in USDA inspected facilities
- Chemical resistant
- Excellent immersion service
- Direct to metal application for tanks and structural steel
- Corrosion resistant

RECOMMENDED USES

For use on prepared steel or concrete surfaces exposed to continuous immersion in potable water.

Lining system for the interior of steel tanks and concrete reservoirs used for potable water, water treatment, and marine immersion service. Meets requirements of AWWA C210-92 for coating systems for the interior and exterior of steel water pipelines. Meets NSF Standard 61 requirements for use in potable water storage tanks.
Acceptable for use with cathodic protection systems.
Conforms to AWWA D102-97 Inside Coating System #1, #2, and #3.

PRODUCT CHARACTERISTICS

Finish: Semi-gloss

Color: Sanitary White, Light Blue

Volume Solids: 80% ± 2%, mixed

Weight Solids: 90% ± 2%, mixed

VOC (EPA Method 24): Unreduced 177 g/L; 1.48 lb/gal
mixed Reduced 10%: 240 g/L; 2.00 lb/gal

Mix Ratio: 2 component, premeasured 4:1

Recommended Spreading Rate per coat:

Wet mils:	6.0 - 10.0
Dry mils:	5.0 - 8.0*
Coverage:	160 - 255 sq ft/gal approximate

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.
* See Recommended Systems

Drying Schedule @ 10.0 mils wet @ 50% RH:

	@ 55°F	@ 77°F	@ 120°F
To touch:	7 hours	3 hours	1 hour
Tack free:	8 hours	4 hours	2 hours
To recoat:			
minimum:	48 hours	18 hours	4 hours
maximum:	60 days	60 days	60 days
To cure:	14 days	7 days	3 days
Pot Life:	4 hours	2 hours	30 minutes
Sweat-in Time:	30 minutes	15 minutes	not required

If maximum recoat time is exceeded, abrade surface before recoating. Drying time is temperature, humidity, and film thickness dependent.

For **Potable Water Service,** allow a minimum cure time of 7 days (@ 77°F) prior to placing into service, sterilize and thoroughly rinse with potable water. See methods outlined in AWWA C652-92.

Shelf Life: 36 months, unopened, at 77°F

Flash Point: 80°F, PMCC, mixed

Reducer/Clean Up: Xylene, R2K4

PERFORMANCE CHARACTERISTICS

System Tested: (unless otherwise indicated)
Substrate: Steel
Surface Preparation: SSPC-SP10
2 cts. Tank Clad HS @ 6.0 mils dft/ct

Abrasion Resistance:
Method: ASTM D4060, CS17 wheel, 1000 cycles, 1 kg load
Result: 120 mg loss
Adhesion:
Method: ASTM D4541
Result: 1000 psi
Direct Impact Resistance: (on cold rolled steel)
Method: ASTM D2794
Result: 30 in. lbs.
Dry Heat Resistance:
Method: ASTM D2485 (discolors)
Result: 200°F
Exterior Durability:
Method: 1 year at 45° South
Result: Excellent, chalks
Flexibility: (on cold rolled steel)
Method: ASTM D522, 180° bend, 1" mandrel
Result: Passes
Moisture Condensation Resistance:
Method: ASTM D4585, 100°F, 1000 hours
Result: No blistering, underfilm corrosion, or rust creepage observed
Pencil Hardness:
Method: ASTM D3363
Result: 4H
Salt Fog Resistance:
Method: ASTM B117, 1000 hours
Result: No blistering, underfilm corrosion, or rust creepage observed.

Epoxy coatings may darken or yellow following application and curing.

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PRODUCT INFORMATION

RECOMMENDED SYSTEMS

Steel, potable water service:
2 cts. Tank Clad HS @ 5.0 - 8.0 mils dft/ct

Steel:
1 ct. Steel Seam Epoxy @ 55 - 65 mils dft (as required to seal seams and radius joints)
2 cts. Tank Clad HS @ 5.0 - 8.0 mils dft/ct

*** Steel, Shop Applied system, New Construction, AWWA D102:**
1 ct. Tank Clad HS @ 3.0 - 8.0 mils dft
1 ct. Tank Clad HS @ 5.0 - 8.0 mils dft

Concrete:
2 cts. Tank Clad HS @ 5.0 - 8.0 mils dft/ct

Concrete, fresh water service:
1 ct. Kem Cati-Coat HS Epoxy Filler/Sealer @ 10.0 - 20.0 mils dft, as required to fill voids and provide a continuous substrate
2 cts. Tank Clad HS @ 5.0 - 8.0 mils dft/ct

Steel, atmospheric service:
1-2 cts. Tank Clad HS @ 5.0 - 8.0 mils dft/ct

Steel, atmospheric service:
1 ct. Tank Clad HS @ 5.0 - 8.0 mils dft
2 cts. Hi-Solids Polyurethane @ 3.0 - 4.0 mils dft/ct

Sher-Plate Epoxy Patching and Grout Compound can be used for smoothing and sealing welds, rivets, and chine areas.

The systems listed above are representative of the product's use. Other systems may be appropriate.

SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Refer to product Application Bulletin for detailed surface preparation information.

Minimum recommended surface preparation:

Iron & Steel:	
Atmospheric:	SSPC-SP6
Immersion:	SSPC-SP10, 2-3 mil profile
Concrete & Masonry:	
Atmospheric:	SSPC-SP 13/Nace 6
Immersion:	SSPC-SP 13/Nace 6-4.3.1 or 4.3.2

COLOR AVAILABILITY/TINTING

Do not tint.

Color: Sanitary White, Light Blue.

APPLICATION CONDITIONS

Temperature:	55°F minimum, 120°F maximum (air, surface, and material)
	At least 5°F above dew point
Relative humidity:	85% maximum

Refer to product Application Bulletin for detailed application information.

ORDERING INFORMATION

Packaging:	5 gallons mixed
Part A:	4 gallons in a 5 gallon container
Part B:	1 gallon
Weight per gallon:	14.4 ± 0.2 lb, mixed

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

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PART B	B60V80	HARDENER

APPLICATION BULLETIN

Revised 1/2000

SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Iron & Steel (immersion service)

Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. Minimum surface preparation is Near White Metal Blast Cleaning per SSPC-SP10. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2-3 mils). Remove all weld spatter and round all sharp edges by grinding to a minimum 1/4" radius. Prime any bare steel the same day as it is cleaned or before flash rusting occurs.

Iron & Steel (atmospheric service)

Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. Minimum surface preparation is Commercial Blast Cleaning per SSPC-SP6. For better performance, use Near White Metal Blast Cleaning per SSPC-SP10. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2 mils). Prime any bare steel the same day as it is cleaned or before flash rusting occurs.

Poured Concrete

New

For surface preparation, refer to SSPC-SP13/NACE 6. Surfaces must be clean, dry, sound and offer sufficient profile to achieve adequate adhesion. Minimum substrate cure is 28 days at 75°F. Remove all form release agents, curing compounds, salts, efflorescence, laitance, and other foreign matter by sandblasting, shotblasting, mechanical scarification, or suitable chemical means such as muriatic acid etch, refer to ASTM D4260. Rinse thoroughly to achieve a final pH between 6.0 and 10.0. Allow to dry thoroughly prior to coating

Old

Surface preparation is done in much the same manner as new concrete, however, if the concrete is contaminated with oils, grease, chemicals, etc., they must be removed by cleaning with a strong detergent. Refer to ASTM D4258. Form release agents, hardeners, etc. must be removed by sandblasting, shotblasting, mechanical scarification, or suitable chemical means. If surface deterioration presents an unacceptably rough surface, Kem Cati-Coat HS Epoxy Surfacer is recommended to patch and resurface damaged concrete.

Fill all cracks, voids and bugholes with SherPlate Epoxy Patch.

Always follow the ASTM methods listed below:

ASTM D4258 Standard Practice for Cleaning Concrete.
ASTM D4259 Standard Practice for Abrading Concrete.
ASTM D4260 Standard Practice for Etching Concrete.
ASTM D4263 Plastic Sheet Method for Checking Moisture in Concrete.
SSPC-SP 13/Nace 6 Surface Preparation of Concrete

Immersion Service:

In addition to the above surface preparation, Brush Blasting of the concrete surface is required.

APPLICATION CONDITIONS

Temperature:	55°F minimum, 120°F maximum (air, surface, and material) At least 5°F above dew point
Relative humidity:	85% maximum

APPLICATION EQUIPMENT

The following is a guide. Changes in pressures and tip sizes may be needed for proper spray characteristics. Always purge spray equipment before use with listed reducer. Any reduction must be compatible with the existing environmental and application conditions.

Reducer/Clean up ..... Xylene, R2K4

Use of any other solvent than Xylene, R2K4 may affect the performance or compliance of this product for its intended service.

Airless Spray

Pressure	2400 psi
Hose	3/8" ID
Tip	.015" - .019"
Filter	30 mesh
Reduction	as needed up to 10% by volume

Conventional Spray

Gun	Binks 95
Fluid Nozzle	66
Air Nozzle	68PB
Atomization Pressure	80 psi
Fluid Pressure	30 psi
Reduction	as needed up to 10% by volume

Brush

Brush	Natural Bristle
Reduction	not recommended

Roller

Cover	3/8" - 1/2" woven with phenolic core
Reduction	not recommended

If specific application equipment is listed above, equivalent equipment may be substituted.

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APPLICATION BULLETIN

APPLICATION PROCEDURES

Surface preparation must be completed as indicated.

Mix contents of each component thoroughly with power agitation. Make certain no pigment remains on the bottom of the can. Then combine four parts by volume of Part A with one part by volume of Part B. Thoroughly agitate the mixture with power agitation. Allow the material to sweat-in as indicated. Re-stir before using.

If reducer solvent is used, add only after both components have been thoroughly mixed, after sweat-in.

Apply paint to the recommended film thickness and spreading rate as indicated below:

Recommended Spreading Rate per coat:

Wet mils:	6.0 - 10.0
Dry mils:	5.0 - 8.0*
Coverage:	160 - 255 sq ft/gal approximate

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

* See Recommended Systems

Drying Schedule @ 10.0 mils wet @ 50% RH:

	@ 55°F	@ 77°F	@ 120°F
To touch:	7 hours	3 hours	1 hour
Tack free:	8 hours	4 hours	2 hours
To recoat:			
minimum:	48 hours	18 hours	4 hours
maximum:	60 days	60 days	60 days
To cure:	14 days	7 days	3 days
Pot Life:	4 hours	2 hours	30 minutes
Sweat-in Time:	30 minutes	15 minutes	not required

If maximum recoat time is exceeded, abrade surface before recoating. Drying time is temperature, humidity, and film thickness dependent.

For **Potable Water Service,** allow a minimum cure time of 7 days (@ 77°F) prior to placing into service, sterilize and thoroughly rinse with potable water. See methods outlined in AWWA C652-88.

Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance.

PERFORMANCE TIPS

Stripe coat all crevices, welds, and sharp angles to prevent early failure in these areas.

When using spray application, use a 50% overlap with each pass of the gun to avoid holidays, bare areas, and pinholes. If necessary, cross spray at a right angle

Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness or porosity of the surface, skill and technique of the applicator, method of application, various surface irregularities, material lost during mixing, spillage, overthinning, climatic conditions, and excessive film build.

Excessive reduction of material can affect film build, appearance, and may cause lifting of old paint.

Do not apply the material beyond recommended pot life.

Do not mix previously catalyzed material with new.

In order to avoid blockage of spray equipment, clean equipment before use or before periods of extended downtime with Xylene, R2K4.

Holiday Detection: Use a wet sponge-type detector such as KD Bird Dog or equivalent equipment per manufacturer's recommendation. Test only cured coating, as solvent entrapment in fresh films may provide false readings.

For **Potable Water Service,** allow a minimum cure time of 7 days (@ 77°F) prior to placing into service, sterilize and thoroughly rinse with potable water. See methods outlined in AWWA C652-92.

Refer to Product Information sheet for additional performance characteristics and properties.

CLEAN UP INSTRUCTIONS

Clean spills and spatters immediately with Xylene, R2K4. Clean tools immediately after use with Xylene, R2K4. Follow manufacturer's safety recommendations when using any solvent.

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

SHERWIN WILLIAMS

MASONRY COATING SYSTEMS
Concrete Solutions. Solid Results.

108.11

LOXON®
EXTERIOR MASONRY ACRYLIC PRIMER
A24W300

CHARACTERISTICS

Loxon Exterior Acrylic Masonry Primer is an acrylic coating specifically engineered for exterior, above-grade, masonry surfaces requiring a high performance primer. It is highly alkali and efflorescence resistant. It reinforces the performance of exterior latex paints and can be used on concrete, concrete block, brick, and stucco. This may be applied to a surface with a pH of 6 to 13.

Color: White
Coverage:
Recommended: 200 sq ft/gal @ 8 mils wet; 3.2 mils dry
Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent
Touch: 4 hours
Recoat: 24 hours
Flash Point: 201°F, PMCC
Finish: 0-10 units @ 85°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
White	0-4	not controlled

Vehicle Type: Acrylic
VOC: 130 grams/liter; 1.09 lb/gal
Volume Solids: 40 ± 2%
Weight Solids: 53 ± 2%
Weight per Gallon: 10.7 lb

PHYSICAL PROPERTIES

Moisture Resistance	Passes
MIL-P-14267B, 2 hour immersion	
Wind-Driven Rain Test	Passes
TT-C-555B, 98 m.p.h. wind velocity	
Moisture Vapor Permeability	1.5 perms
ASTM D1653-72, 1 coat @ 3.8 mils dft	
Flexibility	Passes
ASTM D1737, 180° bend, 1/8" mandrel	
Tensile Strength	190 psi
1 coat @ 3.8 mils dft	
Elongation	350%
1 coat @ 3.8 mils dft	
Alkali Resistance	Passes
TT-P-1511B4.4.11	
Mildew Resistance	Passes

SPECIFICATION

Concrete, Stucco, Block
1 ct. Loxon Exterior Acrylic Masonry Primer
2 cts. Appropriate latex topcoat

APPLICATION

Apply at temperatures above 50°F.
No reduction necessary.
Brush
Use a quality nylon/polyester brush.
Roller
Use a quality 1/2" to 1-1/2" nap synthetic roller cover.
Spray—Airless
Pressure ..... 2000-2700 psi
Tip ..... .019"
Reduction ..... none
Spray—Conventional
Air Pressure ..... 40-60 psi
Fluid Pressure ..... 20 psi
Cap/Tip 704/FX
Reduction ..... up to 1 pint/gallon

SURFACE PREPARATION

Concrete/Stucco/Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Pressure clean (minimum 2100 psi) to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, peeling and defective coatings, chalks, etc. Allow the surface to dry before proceeding. Repair cracks, voids, and other holes with ConSeal Patches and Sealants

Mildew
Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

continued on back

108.11

LOXON®

EXTERIOR MASONRY ACRYLIC PRIMER A24W300

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
A24W300

Pigment by weight	29%
Titanium Dioxide	13%
Silica/Silicates	16%
Vehicle by weight	71%
Acrylic Resin	19%
Water	44%
Glycol	2%
Additives	6%
Total	100%

CAUTIONS

For exterior use only.
Protect from freezing.
Non-photochemically reactive.
Do not paint in direct sun or on a hot surface.
May be applied to damp but not to wet surfaces.

LABEL CAUTIONS
Contains CRYSTALLINE SILICA and ZINC. Use only with adequate ventilation. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains chemicals known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB521 4/99
07 00

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

SHERWIN WILLIAMS

PREPRITE™ 400

INTERIOR LATEX PRIMER

Formerly
ProMar® 400 Interior Latex Wall Primer

B28W400

CHARACTERISTICS

- Good value **wall** primer for general use under **flats** and **enamels** wall paints
- Ensures finish coat will cover when a moderate color change is required.
- Good drywall sealer

Use on interior:

- Drywall
- Masonry
- Concrete
- Previously Painted Surfaces

Color:	White
Coverage:	400 sq ft/gal @4 mils wet; 1.1 mils dry
Drying Time, @ 77°F, 50% RH: temperature and humidity dependent	
Touch:	1 hour
Recoat:	4 hours
Flash Point:	201°F, PMCC
Finish:	0-5 units @ 85°
Solvent/Reducer:	Water

Tinting - For better hiding of deeper colors, use up to 2 oz per gallon of Blend-A-Color Toner to approximate the topcoat color. Check color before use.

Vehicle Type:	Vinyl Acrylic
VOC (as packaged):	63 grams/liter; 0.5 lbs/gal
Volume Solids:	29 ± 2%
Weight Solids:	43 ± 2%
Weight per Gallon:	10.4 lbs

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-650C, Type I

APPLICATION

Topcoat with architectural latex or oil finishes.
Do not apply at temperatures below 50°F.

Brush - No reduction necessary. Use a nylon/polyester brush.
Roller - No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.
Pad - No reduction necessary.
Spray - Airless

Pressure	2000 psi
Tip	.017"-.021"
Reduction	none

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with ProBlock Primer Sealer.

Drywall - Fill cracks and nail holes with patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry Concrete, Cement - All surfaces must be cured. Remove all form release and curing agents. Masonry surfaces must be dry before priming. Moisture content must be 15% or lower, and the pH between 5 and 9.

Plaster - Must be cured, usually 30 days, and hard. If painting cannot wait, allow the surface to dry 7 days and prime with PrepRite Masonry Primer. Soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with water and allow to dry before painting.

Caulking - After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

Continued on back

108.02

PREPRITE™ 400

INTERIOR LATEX PRIMER

B28W400

SURFACE PREPARATION

Mildew - remove before painting by washing with a solution of 1 quart liquid bleach and 3 quarts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

LABEL ANALYSIS

B28W400

Pigment by Weight	29%
Titanium Dioxide	5%
Silica/Silicates	24%
Vehicle by Weight	71%
Vinyl Acrylic Resin	12%
Water	55%
Additives	4%
Total	100%

CAUTIONS

For interior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
See label for additional cautions.

LABEL CAUTIONS

Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.
DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure.
WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB532

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

SHERWIN WILLIAMS

PREPRITE™ 200

INTERIOR LATEX PRIMER

Formerly
ProMar® 200 Interior Latex Wall Primer

B28W200

CHARACTERISTICS

- Best quality **wall** primer for general purpose use under **flats** and **enamels**
- Excellent coverage
- Excellent **drywall sealer**
- Covers dark colors, excellent for dramatic topcoat color changes

Use on interior:

- Drywall
- Masonry
- Concrete
- Previously Painted Surfaces

Color:	White
Coverage:	400 sq ft/gal @4 mils wet; 1.1 mils dry
Drying Time, @ 77°F, 50% RH: temperature and humidity dependent	
Touch:	1 hour
Recoat:	4 hours
Flash Point:	@ 77°F, PMCC
Finish:	0-5 units @ 85°
Solvent/Reducer:	Water

Tinting - For better hiding of deeper colors, use up to 2 oz per gallon of Blend-A-Color Toner to approximate the topcoat color. Check color before use.

Vehicle Type:	Vinyl Acrylic
VOC (as packaged):	
26 grams/liter; 0.22 lbs/gal	
Volume Solids:	28 ± 2%
Weight Solids:	43 ± 2%
Weight per Gallon:	10.6 lbs

Meets the performance requirements, not necessarily composition, of Federal Specification: TT-P-650, Type I

error see MSDS

APPLICATION

Topcoat with latex, oil, water based epoxy, or solvent based epoxy on architectural applications.
Do not apply at temperatures below 50°F.

Brush - No reduction necessary. Use a nylon/polyester brush.
Roller - No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.
Pad - No reduction necessary.
Spray - Airless

Pressure	2000 psi
Tip	.017"-.021"
Reduction	none

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with ProBlock Primer Sealer.

Drywall - Fill cracks and nail holes with patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry Concrete, Cement - All surfaces must be cured. Remove all form release and curing agents. Masonry surfaces must be dry before priming. Moisture content must be 15% or lower, and the pH between 5 and 9.

Plaster - Must be cured, usually 30 days, and hard. If painting cannot wait, allow the surface to dry 7 days and prime with PrepRite Masonry Primer. Soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with water and allow to dry before painting. PrepRite 200 Latex Wall Primer is recommended on plaster only under solvent based epoxies.

Caulking - After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

Continued on back

108.01

PREPRITE™ 200

INTERIOR LATEX PRIMER

B28W200

SURFACE PREPARATION

Mildew - remove before painting by washing with a solution of 1 quart liquid bleach and 3 quarts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

LABEL ANALYSIS
B28W200

Pigment by Weight	31%
Titanium Dioxide	12%
Silica/Silicates	19%
Vehicle by Weight	69%
Vinyl Acrylic Resin	11%
Water	54%
Additives	4%
Total	100%

CAUTIONS

For interior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.

LABEL CAUTIONS

Caution contains CRYSTALLINE SILICA
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area.
Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use.
Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.
DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure.
WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB532

The information, ratings, and opinions stated here pertain to the material offered at the time of publication and represent the results of tests believed to be reliable. Published technical data and instructions are subject to change.

— Section 1 —
Product Identification

Material Safety Data Sheet

The Sherwin-Williams Co.
101 Prospect Ave. N.W.
Cleveland, OH 44115

Emergency telephone number (216) 566-2917
Information telephone number (216) 566-2902
Date of preparation March 10, 1998

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PrepRite™ Latex Interior /Exterior Finishes

PR

— Section 2 — CAS No. Hazardous Ingredients (percent by weight)	ACGIH TLV <STEL>	OSHA PEL <STEL>	Units	Vapor Pressure (mm Hg)	Int./Ext. Block Filler B25 W 25	Classic Interior Latex Primer B28 W 101 White	200 Interior Latex Primer B28 W 200 White	Interior Acrylic Masonry Primer B28 W 300 White	400 Interior Latex Wall Primer B28 W 400 White	High Build Interior Latex Primer/ Surfacer B28 W 601 White	ProBlock™ Int./Ext. Primer/Sealer B51 W 20 White	Anchor-Bond™ Adhestion Promoting Primer B51 W 50
107-21-1 § Ethylene Glycol.	C 50	50	PPM	0.1						1		
14808-60-7 Quartz	0.1	0.1	Mg/M3	as Resp. Dust		3	2	12	0.8	7		9
14464-46-1 Cristobalite	0.05	0.05	Mg/M3	as Resp. Dust		0.9		1			0.6	
1332-58-7 Kaolin	2	5	Mg/M3	as Resp. Dust	7				9			
14807-96-6 Talc	2	2	Mg/M3	as Resp. Dust		4	5		5		3	
12001-26-2 Mica	3	3	Mg/M3	as Resp. Dust		3						4
471-34-1 Calcium Carbonate.	10	15[5]	Mg/M3 [Resp.	as Dust Fraction]	51					7		11
13463-67-7 Titanium Dioxide.	10	10[5]	Mg/M3 [Resp.	as Dust Fraction]	2	16	12	13	5	4	16	9
1314-13-2 Zinc Oxide	10	10[5]	Mg/M3 [Resp.	as Dust Fraction]								1
[% Barium]											[0.3]	
§ Zinc Compound. [% Zinc]												2 [1.4]
Weight per Gallon (lbs.)					13.62	11.55	10.59	10.53	10.34	10.61	11.17	11.07
Percent Water					28.5	40.8	54.5	43.5	55.1	59.0	44.4	41.7
VOC (Volatile Organic Compounds) Total - lbs./gal.					0.24	0.33	0.22	0.49	0.15	0.14	0.34	0.15
VOC Less Water & Federally Exempt Solvents - lbs./gal.					0.45	0.77	0.72	1.10	0.50	0.60	0.84	0.34
Photochemically Reactive					No	No	No	No	No	No	No	No
Flash Point (°F)					None	None	None	None	None	None	None	None
HMIS (NFPA) Rating (health - flammability - reactivity)					1 - 0 - 0	1* - 0 - 0	1* - 0 - 0	1* - 0 - 0	1* - 0 - 0	2* - 0 - 0	1* - 0 - 0	1* - 0 - 0

Numbers In Boxes Are Percent By Weight

§ Ingredient subject to the reporting requirements of the Superfund Amendments and Reauthorization Act (SARA) Section 313, 40 CFR72.65 C

→→→ *MSDS Text Page Follows* →→→

Section 3 —Physical Data

PRODUCT WEIGHT	See TABLE	*EVAPORATION RATE*	Slower than Ether
SPECIFIC GRAVITY	1.24-1.64	*VAPOR DENSITY*	Heavier than Air
BOILING RANGE	212-477 °F	*MELTING POINT*	N.A.
VOLATILE VOLUME	49 76 %	*SOLUBILITY IN WATER*	N.A.
pH	9.0-10.0		

Section 4 —Fire And Explosion Hazard Data

FLAMMABILITY CLASSIFICATION *FLASH POINT* See TABLE *LEL* N.Ap. *UEL* N.Ap.
Not Applicable
EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Alcohol Foam
UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.
SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build up and possible autoignition or explosion when exposed to extreme heat.

Section 5 —Health Hazard Data

ROUTES OF EXPOSURE
Exposure may be by INHALATION and/or SKIN or EYE contact, depending on conditions of use. To minimize exposure, follow recommendations for proper use, ventilation, and personal protective equipment.
ACUTE Health Hazards
EFFECTS OF OVEREXPOSURE
Irritation of eyes, skin and upper respiratory system. In a confined area vapors in high concentration may cause headache, nausea or dizziness.
SIGNS AND SYMPTOMS OF OVEREXPOSURE
Redness and itching or burning sensation may indicate eye or excessive skin exposure.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
None generally recognized.
EMERGENCY AND FIRST AID PROCEDURES
If INHALED: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
If on SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.
If in EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
If SWALLOWED: Get medical attention.
CHRONIC Health Hazards
Crystalline Silica (Quartz, Cristobalite) is listed by IARC and NTP. Long term exposure to high levels of silica dust, which can occur only when sanding or abrading the dry film, may cause lung damage (silicosis) and possibly cancer.
Ethylene Glycol is considered an animal teratogen. It has been shown to cause birth defects in rats and mice at high doses when given in drinking water or by gavage. There is no evidence to indicate it causes birth defects in humans.
Prolonged overexposure to solvent ingredients in Section 2 may cause adverse effects to the liver and urinary systems.
Rats exposed to titanium dioxide dust at 250 mg./m3 developed lung cancer, however, such exposure levels are not attainable in the workplace.

Section 6 —Reactivity Data

STABILITY Stable
CONDITIONS TO AVOID
None known.
INCOMPATIBILITY
None known.
HAZARDOUS DECOMPOSITION PRODUCTS
By fire: Carbon Dioxide, Carbon Monoxide, Oxides of Metals in Section 2
HAZARDOUS POLYMERIZATION Will Not Occur

Section 7 —Spill Or Leak Procedures

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate and remove with inert absorbent.
WASTE DISPOSAL METHOD
Waste from *B51W20* may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Waste must be tested for extractability to determine the applicable EPA hazardous waste numbers.
Waste from other products is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.
Incinerate all products in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section 8 —Protection Information

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation. Avoid breathing vapor and spray mist. Avoid contact with skin and eyes. Wash hands after using.
These coatings may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg./m3 (total dust), 3 mg./m3 (respirable fraction), OSHA PEL 15 mg./m3 (total dust), 5 mg./m3 (respirable fraction).
VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.
RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.
When sanding, wirebrushing, abrading, burning or welding the dried film, wear a particulate respirator approved by NIOSH/MSHA for protection against non-volatile materials in Section 2.
PROTECTIVE GLOVES
Wear gloves which are recommended by glove supplier for protection against materials in Section 2.
EYE PROTECTION
Wear safety spectacles with unperforated sideshields.

Section 9 —Precautions

DOL STORAGE CATEGORY – Not Applicable
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

Section 10 —Other Regulatory Information

CALIFORNIA PROPOSITION 65
WARNING: B28W300 contains a chemical known to the State of California to cause cancer. B25W25, B28W101, B28W200, B28W400, B28W601, B51W20 and B51W50 contain chemicals known to the State of California to cause cancer.

TSCA CERTIFICATION
All chemicals in these products are listed, or are exempt from listing, on the TSCA Inventory.

This Material Safety Data Sheet conforms to the Hazard Communication standard, 29 CFR 1910.1200(g)(4), for similar complex mixtures.
The above information pertains to these products as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to these products may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

DATA ISSUES
APPENDIX E

SHER-WOOD® CAB-ACRYLIC LACQUER

SHER-W00D® CAB-Acrylic Lacquer is formulated to meet the water white and non-yellowing demands of the furniture, kitchen cabinet, and wood finishing markets. It is intended as a clear topcoat over white, "pickled" or light pastel stains where the best non-yellowing properties are required. Cellulose Acetate Butyrate (CAB)-Acrylic presents the best chemistry of lacquers for resistance to yellowing.

Advantages:

- Meets the federal HAPS rule for wood products as packaged*
- Water-white color
- Excellent resistance to yellowing - superior to all nitrocellulose compositions
- Meets KCMA specifications when applied over SHER-WOOD Vinyl Sealer T67F3
- VOC under 5.6 lb/gal
- Fast drying - similar to nitrocellulose lacquers
- May be used directly over solid color lacquers as a "scuff coat"
- Excellent film clarity and color retention
- Application by conventional, airless or air assisted airless spray equipment
- Excellent print resistance after overnight dry
- May be used as a shading lacquer or toner by adding small quantities of Chroma Chem 844 colorants or SHER-WOOD Dye Stains

SHER-WOOD® KEM AQUA® LACQUER

SHER-WOOD® KEM AQUA® Lacquer is a high quality, water reducible, acrylic latex, clear system for finishing furniture, cabinets and a wide variety of wood and novelty items without the hazards associated with nitrocellulose lacquer and highly flammable solvents. It offers improved clarity and ease of handling over other latex coatings and meets all current EPA regulations for volatile organic compounds emissions for wood finishing.

Advantages:

- Meets KCMA specifications
- Very low VOC under 2.0 lb/gal less water
- Very low volatile organic emissions - less than 1.0 lb/gal
- Excellent film clarity - like solvent based nitrocellulose lacquers
- Meets the Federal HAPS rule for Wood Finishes as packaged*
- Complete water system that handles and performs much like a lacquer
- Excellent mar resistance
- Better resistance to microfoaming than other latex clears
- Minimizes tannin bleed discoloration when used with Sher-Wood Kem Aqua Lacquer Sanding Sealer T65F520
- Dries to handle and sand in 30 minutes at room temperature
- Very good hardness, block resistance, and print resistance
- Offers greater safety to the user because it does not contain the volatile flammable organic

solvents typical of lacquers
Contains water. Reduced with water
Excellent resistance to blushing
No flash point

*National Standards for Hazardous Air Pollutants (HAPS) Emissions for Wood Furniture Manufacturing Operations, CFR 40, Part 63, Subpart JJ

SHERWIN WILLIAMS

111.50

CUPRINOL®

CLEAR DECK & WOOD SEAL

DESCRIPTION

Clear Deck and Wood Seal

- Powerful oil-based formula specially engineered for pressuretreated wood, redwood, and cedar.
- Powerful water repellents to seal water out and protect against cracking, splitting, warping, swelling and pigment wash off.
- Contains special ingredients to make water bead up and roll off to protect wood.
- Leaves protective coating that resists discoloration caused by mildew.
- Allows wood to gray and weather naturally.
- Advanced waterborne formula is safe to use, odorless and nonflammable.
- Apply immediately to absorbent pressure-treated wood.
- Provides oil-based protection with the ease of water cleanup.
- Recommended for use on wood siding, fences, decks and outdoor furniture.
- Easy to use - apply with spray, brush or pad; conveniently cleans up with soap and water.
- Formulated to meet the strictest Volatile Organic Compound (VOC) air pollution regulations in the United States.

CHARACTERISTICS

Color: Clear

Coverage:

Recommended: 200-300 sq ft/gal
no dry surface film

Drying Time, @ 77°F 50% RH:

temperature and humidity dependent

Touch: 12 hours

Recoat: 2 hours

Due to the composition of Clear Deck and Wood Seal, if a second coat is needed, apply it within 2 hours of the first coat. If this 2 hour window is exceeded, the second coat will not penetrate and adhere properly. The surface must weather until water will not bead up on the surface before applying another coat.

Flash Point:	201°F (PMCC)
Finish:	no surface film
Solvent:	Water
Vehicle Type:	Alkyd
VOC: (Total)	27 g/L; 0.23 lb/gal
(less water)	283 g/L; 2.36 lb/gal
Volume Solids:	6.4 ± 2%
Weight Solids:	6.7 ± 2%
Weight per Gallon:	8.3 lbs

CLEAN UP INFORMATION

Clean brushes and tools with soap and warm water immediately after use. If clean up is delayed use hot soapy water.

SURFACE PREPARATION

On all wood surfaces, use Cuprinol Revive® Deck Cleaner or Cuprinol Liquid Deck Wash to remove stains caused by dirt, mildew and algae. Test absorbency by sprinkling a few drops of water on the wood to be treated. If the water is rapidly absorbed, the surface is ready for product application; if not, wait a few weeks and test again.

Note: This test is especially recommended for pressure-treated wood and smooth cedar. It is critical toensure proper penetration of the product. Surfaces must be clean, dry, absorbent, and structurally sound.

Some woods, specifically cedar and redwood, contain resins which may "bleed" to the surface, resulting in a discoloration of the wood. If this occurs, clean with a 10% oxalic acid/90% water solution.

This product must be applied out-of-doors to wood intended for exterior use only. Not for interior use. Before use, thoroughly stir contents of can. For uniformity, mix all cans together before use and stir occasionally during use. Apply to clean, dry, cedar, redwood, pressure-treated wood and most other woods. Do not apply over hardboard particleboard, orwood coated with paint, creosote-based materials or latex products. It is not recommended to thin or mix with any other stains or any other Cuprinol brand products.

Continued on back

111.50

CUPRINOL®

CLEAR DECK & WOOD SEAL

APPLICATION

Use a synthetic bristle brush, pad, spray or dip (siding 15-30 seconds). Backbrush after spray or dip. Apply immediately to absorbent wood to minimize cracking, splitting and warping. A samplebrushout is recommended to ensure satisfaction. One coat is normally sufficient. If the first coat is rapidly absorbed, apply a second coat within 2 hours after the first coat is applied. Do not apply more that 2 coats. Do not thin. Thoroughly cover cut ends and joints. For best results apply in shade with surface temperatures between 50°F and 90°F. Do not apply if temperatures will fall below 40°F or if rain is expected within 24 hours after application. Cooler temperatures require longer drying times. Depending on wood type, temperature and humidity, this product normally dries in 5 hours, but thorough drying requires 24 hours. Maintain protection by reapplying when water begins to pool (instead of beading) on wood surface and when wood begins to gray and weather naturally. May be applied to damp, but not wet, surfaces (best applied to dry surfaces).

Note: New wood normally requires less product than old, weathered wood. This is due to older wood being more porous than newer wood.

CAUTIONS

This product must be applied out-of-doors to wood intended for exterior use only. Not for interior use.
Do not use on roofs.
Use at temperatures between 50 and 90°F.
See label for additional cautions.

- To protect wood below ground and for wood in contact with water, use Cuprinol No. 10 Green Wood Preservative.
- To protect wood above ground from decay and rot, as well as mildew, use Cuprinol Clear Wood Preservative.
- To protect wood from turning gray, use Cuprinol UV Sunblock Deck & Wood Seal or Cuprinol Clear Deck & Siding Wood Finish.

The information, ratings, and opinions stated here pertain to the material offered at the time of publication and represent the results of tests believed to be reliable. Published technical data and instructions are subject to change.

PRODUCT CATALOG

Homeowners
Designers
Architects
Industrial Coatings
Professional Contractors

HOME SITE MAP SEARCH

Back to INDEX

Key
L=Latex | **O**=Alkyd/Oil | **S**=Other/Special
Int=For Interior Use | **Ext**= Exterior Use

Code	Product Name	Type
M31/ M32	Waterborne Epoxy Block Filler	S
M43/ M44	Acrylic Epoxy Gloss Coating	S
M56	Safety & Zone Marking Alkyd	O
M58	Safety & Zone Marking Latex	L
M67	Anti-Slip Aggregate	S
M82	Rust Converter	L
M83	Oil & Grease Emulsifier	NA
M85	Concrete Pretreatment & Etch	NA

These profiles are abstracts of the complete Product Technical Data Sheets, which contain detailed product information and are available (PDF format) by clicking on the Technical Data Sheet (pdf) links. They are also available from your Benjamin Moore Representative or local authorized Benjamin Moore dealer.

Quality level descriptions, from good to best, are: Economy, Very Good, Excellent, Premium

Please note that not all Benjamin Moore products are available in

Safety & Zone Marking Latex M58

Back to INDEX
Top of Page

MSDS
Technical Data Sheet (pdf)

Technical Data	White
Generic Type	Acrylic Latex
Clean Up With	Clean Water

Product Information
This fast dry latex coating is designed for marking traffic lanes on streets, highways, parking lots, airports, warehouses, and shopping centers. For designating parking spaces and other vehicular or foot traffic control markings. Traffic beads may be utilized with the coating to provide reflectorized marking. If beads are to be used they should be dropped into the wet paint immediately after application at a rate of 6 pounds per gallon of paint. This coating may be applied to concrete or asphalt surfaces, interior or exterior.

Recommended Uses
Coating asphalt or concrete on interior or exterior surfaces. Performs well when used for marking traffic lanes, streets & highways, parking lots, parking spaces, crosswalks, fire lanes, no parking areas, and other vehicular or foot traffic control markings. For airports, manufacturing plants, shopping centers, schools, hospitals, and warehouses.

Colors:
M58-01 White
M58-10 Yellow
M58-20 Red
M58-30 Blue
M58-80 Black

Tint Bases: None

DATA ISSUES: ATTACHMENT 2

SHER-WOOD® CAB-ACRYLIC LACQUER

SHER-W00D® CAB-Acrylic Lacquer is formulated to meet the water white and non-yellowing demands of the furniture, kitchen cabinet, and wood finishing markets. It is intended as a clear topcoat over white, "pickled" or light pastel stains where the best non-yellowing properties are required. Cellulose Acetate Butyrate (CAB)-Acrylic presents the best chemistry of lacquers for resistance to yellowing.

Advantages:

- Meets the federal HAPS rule for wood products as packaged*
- Water-white color
- Excellent resistance to yellowing - superior to all nitrocellulose compositions
- Meets KCMA specifications when applied over SHER-WOOD Vinyl Sealer T67F3
- VOC under 5.6 lb/gal
- Fast drying - similar to nitrocellulose lacquers
- May be used directly over solid color lacquers as a "scuff coat"
- Excellent film clarity and color retention
- Application by conventional, airless or air assisted airless spray equipment
- Excellent print resistance after overnight dry
- May be used as a shading lacquer or toner by adding small quantities of Chroma Chem 844 colorants or SHER-WOOD Dye Stains

SHERWIN WILLIAMS®

SHER-WOOD®

FINISHES FOR THE WOOD INDUSTRY

1 U.S. Gal

3.78 L

CAB ACRYLIC LACQUER
BRIGHT RUBBED EFFECT
T75 F 16 5010-37899

DANGER! FLAMMABLE – HARMFUL IF INHALED – MAY AFFECT THE BRAIN OR NERVOUS SYSTEM, CAUSING DIZZINESS, HEADACHE OR NAUSEA. IRRITATES EYES, SKIN AND RESPIRATORY TRACT. CAN BE ABSORBED THROUGH THE SKIN. Before using, carefully read CAUTIONS elsewhere on label.

99 00 01

H HEALTH 2

F FLAMMABILITY 3

R REACTIVITY 0

PERSONAL PROTECTION

92

CAS No.	Ingredient
110-19-0	Isobutyl Acetate
78-83-1	2-Methyl-1-propanol
Unknown	Acrylic Polymer
9004-29-8	Cellulose Acetate Butyrate
64742-89-8	V.M. & P. Naphtha
64-17-5	Ethanol
78-93-3	Methyl Ethyl Ketone
26761-40-0	Diisodecyl Phthalate
110-43-0	Methyl n-Amyl Ketone
1330-20-7	Xylene
628-63-7	Amyl Acetate

NON PHOTOCHEMICALLY REACTIVE

0 35777 26216 0

SHER-WOOD® CAB ACRYLIC LACQUER

SHER-WOOD® CAB Acrylic Lacquer is formulated to meet the most water white color and non-yellowing requirements of the furniture, kitchen cabinet and wood finishing markets. It is intended as a clear topcoat over white, "pickled" or light pastel stains where the best water white and non-yellowing properties are required. Cellulose Acetate Butyrate (CAB)-Acrylic represents the best chemistry of lacquers for resistance to yellowing.

SUBSTRATE

Wood surfaces must be clean, dry, finish sanded and dust free to insure optimum performance properties. Apply over stained, sealed and sanded substrate. SHER-WOOD Wiping Stains – S64-Series – are recommended.

SHER-WOOD Vinyl Sealer: 24% Solids T67F3 is recommended as the sealer to meet KCMA performance properties. Do not use a nitrocellulose sealer or as a self seal system.

APPLICATION

SHER-WOOD CAB Acrylic Lacquer may be applied without reduction using conventional, airless or air assisted airless spray equipment. If necessary or desired for better application, you may reduce 5-10% with OPEX® Lacquer Thinner R7 K 120. Spray a full wet coat of CAB Acrylic Lacquer and allow 30-60 minutes drying. For more depth and better appearance, apply a second topcoat.

Recommended Film Thickness: (per coat)

Wet: 5.0 - 6.0 mils **Dry:** 0.7 - 0.9 mils

DRYING

Air Drying:	77°F and 50% R.H.
To Touch:	10 minutes
To Handle:	15-20 minutes
To Sand:	30-60 minutes
To Recoat:	30-60 minutes
To Pack:	Allow overnight drying
Force Dry:	10-20 minutes at 110-140°F

Use OPEX® Lacquer Thinner R7 K 120 or equivalent for cleanup.

Refer to Product Data Sheet CC-F23 for additional data.

FOR INTERIOR USE ONLY

5 93

SHERWIN WILLIAMS®

The Sherwin-Williams Company
Cleveland, Ohio 44115

CAUTIONS

N01524-P(12-93)

Contents are **FLAMMABLE.** Vapors may cause flash fires. Keep away from heat, sparks, and open flame. During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.

SEE CONTENTS STATEMENT ELSEWHERE ON LABEL

VAPOR HARMFUL. Use only with adequate ventilation. Wear an appropriate properly fitted vapor/particulate respirator (NIOSH/MSHA approved) during and after application, unless air monitoring demonstrates vapor/mist levels are below applicable limits. Follow respirator manufacturer's directions for respirator use.

Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.

FIRST AID

If **INHALED:**	If affected, remove from exposure. Restore breathing. Keep warm and quiet.
If on **SKIN:**	Wash affected area thoroughly with soap and water. Remove contaminated clothing. Launder before re-use.
If in **EYES:**	Flush eyes with large amounts of water for 15 minutes. Get medical attention.
If **SWALLOWED:**	Get medical attention immediately.

SPILL AND WASTE

Remove all sources of ignition. Ventilate and remove with inert absorbent. Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulation regarding pollution.

DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Contains solvents which can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

DO NOT TAKE INTERNALLY – KEEP OUT OF THE REACH OF CHILDREN
FOR INDUSTRIAL USE ONLY – SEE MATERIAL SAFETY DATA SHEET

EGAD

DATA ISSUES: ATTACHMENT 3

SHER-WOOD® WHITE CAB-ACRYLIC LACQUER

SHER-WOOD® White CAB-Acrylic Lacquers are designed for interior wood finishing where light stable, non-yellowing whites and pastels are required. These white lacquers can be used for finishing kitchen cabinetry, furniture, and other interior woodworking. Cellulose Acetate Butyrate (CAB) Acrylic represents the best chemistry of lacquers for resistance to yellowing.

Advantages:

- Excellent resistance to yellowing - superior to all nitrocellulose compositions
- Meets KCMA specifications when applied over Sher-Wood Vinyl Sealers, T67F3 and T67F5, Sher-Wood White Vinyl Sealer, P63W2 or Sher-Wood Vinyl Primer Surfacer, P65W4
- Meets the Federal HAPS rule for wood finishes as packaged*
- VOC under 5.5 lb/gal
- Fast drying - similar to nitrocellulose lacquers
- Application by conventional, airless, air-assisted airless, or HVLP spray equipment
- Excellent print resistance after overnight dry
- Can be tinted with ChromaChem® 844 colorants up to 4 oz/gal to make a variety of off-white and pastel colors
- May be blended with Sher-Wood Clear CAB-Acrylic Lacquer

DATA ISSUES: ATTACHMENT 4

SHER-WOOD® KEM AQUA® LACQUER

SHER-WOOD® KEM AQUA® Lacquer is a high quality, water reducible, acrylic latex, clear system for finishing furniture, cabinets and a wide variety of wood and novelty items without the hazards associated with nitrocellulose lacquer and highly flammable solvents. It offers improved clarity and ease of handling over other latex coatings and meets all current EPA regulations for volatile organic compounds emissions for wood finishing.

Advantages:

Meets KCMA specifications
Very low VOC under 2.0 lb/gal less water
Very low volatile organic emissions - less than 1.0 lb/gal
Excellent film clarity - like solvent based nitrocellulose lacquers
Meets the Federal HAPS rule for Wood Finishes as packaged*
Complete water system that handles and performs much like a lacquer
Excellent mar resistance
Better resistance to microfoaming than other latex clears
Minimizes tannin bleed discoloration when used with Sher-Wood Kem Aqua Lacquer Sanding
Sealer T65F520
Dries to handle and sand in 30 minutes at room temperature
Very good hardness, block resistance, and print resistance
Offers greater safety to the user because it does not contain the volatile flammable organic solvents typical of lacquers
Contains water. Reduced with water
Excellent resistance to blushing
No flash point

*National Standards for Hazardous Air Pollutants (HAPS) Emissions for Wood Furniture Manufacturing Operations, CFR 40, Part 63, Subpart JJ

SHER-WOOD™
KEM AQUA™ LACQUER

SHER-WOOD™ KEM AQUA Lacquer is a high quality water reducible acrylic latex clear system for finishing furniture, cabinets and a wide variety of wood and novelty items without the hazards associated with nitrocellulose lacquer and highly flammable solvents. It offers improved clarity and ease of handling over other latex coatings and meets all current regulations for EPA volatile organic compounds emissions for wood finishing. It is fast drying, water white, low odor, has no flash point and is HAPS complying making it a very user friendly product.

SUBSTRATES

Wood surface must be clean, dry, finish sanded and dust free to insure optimum adhesion and coating performances properties.

APPLICATION

SHER-WOOD KEM AQUA Lacquer may be applied by conventional, airless, air assisted or HVLP spray or by dipping. Apply without reduction or reduce up to 5% with water for better control.

Recommended Film Thickness (per coat):

Wet: 3.0-4.0 mils Dry: 0.8-1.1 mils

DRYING

Air Dry:	77°F and 50% RH	
	To Touch	15 minutes
	To Handle	20-30 minutes
	To Recoat	30 minutes
	To Sand	30 minutes
	To Pack	overnight
	To Rub	4 hours minimum
Force Dry:	10-20 minutes @ 120°F or equivalent	

KEM AQUA Lacquer dries primarily by water evaporation. Best drying occurs at relative humidity of 50% or lower and temperatures of 77°F (25°C) or higher. Good air movement is essential for complete dry.

TANNIN BLEED: When finishing Redwood, Red or White Oak, and Cedar Wood with water based finishes, tannins may be extracted from the wood by the water and cause yellowing, staining or discoloration of the stain, sealer and/or topcoat. This tannin bleed is most evident with white or pickled stains and clear topcoats. Users are urged to thoroughly test the system under shop conditions. If tannin bleed is evident, seal with SHER-WOOD Vinyl Sealer 167F3 or 167F5.

Clean mixing equipment with soap and water, then dry thoroughly. Flush spray equipment completely with water followed by flushing with alcohol to remove water residue and to prevent rusting.

When film has aged or when stripping for rework, use a blend of 75 parts Acetone R6K9 and 25 parts household ammonia (or equivalent). KEM AQUA Lacquer must be stored inside and protected from freezing. The use of stainless steel or plastic containers, piping and other components is recommended to prevent rusting.

Refer to product data sheet CC-F41 for additional data.

For Interior Use Only 4/96

PROTECT FROM FREEZING

SHERWIN WILLIAMS
The Sherwin Williams Company
Cleveland, Ohio 44115

SHERWIN WILLIAMS®

SHER-WOOD

FINISHES FOR THE WOOD INDUSTRY

KEM-AQUA®
LACQUER
BRIGHT RUBBED EFFECT
T75 F 526
5010-55388

5 U.S. Gal 18.92 L

CAUTION

SEE CONTENTS STATEMENT EL

Use only with adequate ventilati
sure, open windows and doors
ensure fresh air during applicat
experience eye watering, head
increase fresh air, or wear re
(NIOSH/MSHA TC23C or equivalen

Avoid contact with eyes and sk
using. Keep container closed wh
transfer contents to other containe

FIRST AID: In case of eye contact,
large amounts of water. Get medic
persists. If swallowed, get medical

SPILL AND WA

Remove all sources of ignition. Ve
inert absorbent. Incinerate in ap
incinerate closed container. Dispos
Federal, State, and Local regulation

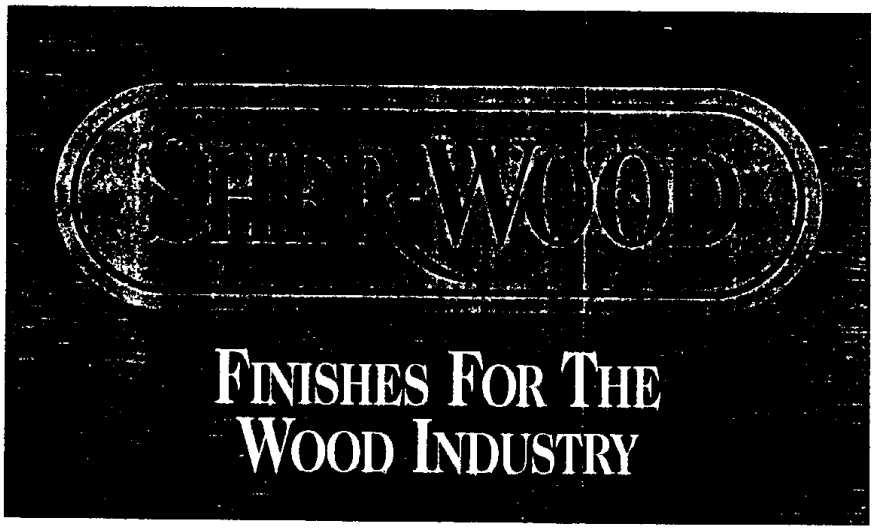
DO NOT TAKE INTE
KEEP OUT OF THE REACH
FOR INDUSTRIAL U
SEE MATERIAL SAFETY

CAS No.	Ingredie
7732-18-5	Wat
Unknown	Acrylic Po
111-76-2	2-Butoxyethan
34590-94-8	2-Methoxymethylethoxypropa
Unknown	Ethylene Glycol Ether

NON-PHOTOCHEMICALLY REACTIVE

P★18

SHERWIN WILLIAMS®



KEM-AQUA®
LACQUER
BRIGHT RUBBED EFFECT

T75 F 526
5010-55388

5 U.S. Gal

18.92 L

P★18

CAUTIONS QB19(X) (7 97)

SEE CONTENTS STATEMENT ELSEWHERE ON LABEL

Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area.

Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.

FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.

SPILL AND WASTE

Remove all sources of ignition. Ventilate and remove with inert absorbent. Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulation regarding pollution.

DO NOT TAKE INTERNALLY
KEEP OUT OF THE REACH OF CHILDREN
FOR INDUSTRIAL USE ONLY
SEE MATERIAL SAFETY DATA SHEET

CAS No.	Ingredient
7732 18 5	Water
Unknown	Acrylic Polymer
111 76 2	2 Butoxyethanol
34590 94 8	2 Methoxymethylethoxypropanol
Unknown	Ethylene Glycol Ethers

NON PHOTOCHEMICALLY REACTIVE

KEEP FROM Freezing

H HEALTH	2
F FLAMMABILITY	0
R REACTIVITY	0
PERSONAL PROTECTION	

0 35777 35200 7

DATA ISSUES: ATTACHMENT 5

POLANE® H. S. PLUS POLYURETHANE ENAMEL

POLANE® HS Plus Polyurethane Enamel is a two component coating providing high gloss, excellent exterior durability and resistance properties along with high volume solids and 2.8 VOC compliance. The single pigment colors are designed for intermixing to achieve great versatility in color matching capability.

Advantages:

- Under 2.8 VOC with Polane HS Plus Catalyst V66V55
- Excellent exterior color and gloss retention with V66V55 catalyst
- Excellent exterior physical and chemical performance properties
- Excellent appearance over many types of metal and plastic substrates
- Ideal coating for machine tool industry with resistance to most lubricants and cutting oils
- High solids - high spreading rate
- Air dry or force dry curing
- Full range of colors may be custom blended
- Excellent hardness and impact resistance
- Excellent mar and abrasion resistance
- Apply by conventional, airless, air assisted airless, HVLP or electrostatic spray
- Much faster drying times achieved with the use of infratherm type ovens
- For interior use, Polane HS Plus may be catalyzed 2:1 with Polane Plus Catalyst V66V44 and reduced 24% MAK
- Free of lead and chromate hazards

POLANE® HS PLUS POLYURETHANE ENAMEL

POLANE HS Plus Polyurethane Enamel is a two component polyurethane coating [illegible] high volume solids and 2.8 VOC compliance. It offers high gloss, excellent hardness, adhesion and chemical resistance, and excellent color and gloss retention for exterior applications using POLANE HS Plus Catalyst, V66 V 55.

SUBSTRATES

Iron and Steel: Surface must be free of dirt, oils, grease, fingerprints, rust, oxidation products and other foreign matters to obtain optimum adhesion and coating performance properties. Chemical treatment or conversion coatings (i.e. iron or zinc phosphate) give the best adhesion and performance properties.

Untreated Metal: Prime with POLANE Plus Primer E65 A 71 or 2.8 VOC Catalyzed Epoxy Primer. For structural steel and heavy duty industrial maintenance applications, sand blast and prime with 2.8 VOC Catalyzed Epoxy Primer at 4-5 mils dry film thickness.

Cast Iron: Fill with POLANE 2.8 Plus Spray Fil D61 H 75 and sand. Seal with POLANE Plus Primer E65 A 71.

Aluminum and Galvanized Iron (Untreated): Prime with Industrial Wash Primer, P60 G 2, or KEM AQUA Wash Primer followed by POLANE Plus Primer E65 A 71 or 2.8 VOC Catalyzed Epoxy Primer.

Plastic: Coating must be evaluated on customer substrate. Filler or barrier coat may be required.

Wood: For interior use only. Surface must be dry, sanded, and dust free. Seal with full coat of POLANE 2.8 Plus Spray Fil D61 H 75.

APPLICATION

POLANE HS Plus Coatings must be catalyzed, by volume, as follows:

3 parts POLANE HS Plus
1 part POLANE HS Plus Catalyst V66 V 55
.48 parts (12 oz.) MAK R6 K 30 maximum to maintain 2.8 VOC

For faster air drying, addition of up to one ounce per gallon of accelerator V66 VB 11 per gallon of uncatalyzed POLANE is recommended.

Working potlife is 3 hours at room temperature without accelerator or about 1 hour with 1 oz./gallon of accelerator. Higher temperature will shorten working potlife.

NOTE: For interior applications, POLANE HS Plus may be catalyzed 2:1 with POLANE Plus Catalyst V66 V 44 and reduced 24% with MAK Reducer R6 K 30 for 3.5 VOC. Working potlife is 1 hour.

Recommended Film Thickness:
Wet: 2.0-2.5 mils Dry: 1.25-1.50 mils

POLANE HS Plus may be applied by conventional, air assisted airless, HVLP, airless or electrostatic spray methods.

DRYING

Catalyzed 3:1 with V66 V 55 at 2.0-2.5 mils wet (1.25-1.50 mils dry film).
Air Drying: (77 F & 50% RH)

	Unaccelerated	with 1 oz./gallon Accelerator V66 VB 11
To Touch	1-1½ hours	½-1 hour
Tack Free	8 hours	1-2 hours
To Handle	10-12 hours	2-3 hours
To Recoat	5-6 hours	1-1½ hours
Working Pot Life	3 hours	1 hour

Force Dry: 30 minutes at 140-180 F.

Use POLANE Reducer R7 K 84, MEK, MAK or MIBK for cleanup. Refer to Product Data Sheet CC D20 for additional data.

Safety Precautions: This product must be mixed with a POLANE Catalyst containing isocyanates. People who have chronic (long term) lung or breathing problems or have had reaction to isocyanates must not be in the area where this product is being applied. In poor application where overspray is not totally controlled, air-supplied respirators are recommended to prevent exposure. Where air-supplied respirators are not available, a chemical cartridge-particulate combination respirator, recommended by the respirator manufacturer for protection against isocyanate spray paints, must be used.

Before using this product, carefully read the instructions and precautions on the catalyst label.

4/96

SHERWIN WILLIAMS
The Sherwin-Williams Company
Cleveland, Ohio 44115

SHERWIN WILLIAMS®
Chemical Coatings

POLANE® HS Plus Polyurethane

WHITE 520-9465

F63 W 66

5 U.S. Gal / 18.92 L

DANGER! FLAMMABLE! HARMFUL IF INHALED - MAY AFFECT THE BRAIN OR NERVOUS SYSTEM, CAUSING DIZZINESS, HEADACHE OR NAUSEA. IRRITATES EYES, SKIN AND RESPIRATORY TRACT.
Before using, carefully read CAUTIONS elsewhere on label.

CAUTIONS

Contents are **FLAMMABLE**. Vapors may cau from heat, sparks and open flame. During u gone: Keep area ventilated - Do not smoke - lights, and heaters - Turn off stoves, electric any other sources of ignition.

SEE CONTENTS STATEMENT ELSEW

VAPOR HARMFUL. Use only with adequate must be used with an appropriate catalyst. Fol ment and instructions on the catalyst.

Avoid contact with eyes and skin. Wash container closed when not in use. Do not containers for storage.

FIRST AID

If **INHALED**:	If affected, remove from exp Keep warm and quiet.
If on **SKIN**:	Wash affected area thoroug Remove contaminated cloth
If in **EYES**:	Flush eyes with large amoun Get medical attention.
If **SWALLOWED**:	Get medical attention immed

SPILL AND WASTE

Remove all sources of ignition. Ventilate absorbent. Incinerate in approved facility. [container. Dispose of in accordance with Federa tion regarding pollution.

DELAYED EFFECTS FROM LONG TERM OV solvents which can cause permanent brain and Intentional misuse by deliberately concentrating can be harmful or fatal. This product must be nents before use. Before opening the packag **WARNING LABELS ON ALL COMPONENTS.** contains chemicals known to the State of Calif birth defects or other reproductive harm.

DO NOT TAKE INTERNA
KEEP OUT OF THE REACH OF
FOR INDUSTRIAL USE O
SEE MATERIAL SAFETY DAT

CAS No	Ingre
13463-6[illegible]	[illegible]
110-43-0	Methyl n-Amyl
68918-91-2	Polymerized Oxyalk
Unknown	[illegible]
108-88-3	[illegible]

E★19 **NON PHOTOCHEMICALLY REACTIV**

SHERWIN WILLIAMS®

Chemical Coatings

POLANE® HS Plus Polyurethane

WHITE 520-9465

F63 W 66

5 U.S. Gal / 18.92 L

DANGER! FLAMMABLE! HARMFUL IF INHALED - MAY AFFECT THE BRAIN OR NERVOUS SYSTEM, CAUSING DIZZINESS, HEADACHE OR NAUSEA. IRRITATES EYES, SKIN AND RESPIRATORY TRACT.

Before using, carefully read CAUTIONS elsewhere on label.

CAUTIONS

K01810(P)(7-97)

Contents are **FLAMMABLE**. Vapors may cause flash fires. Keep away from heat, sparks and open flame. During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.

SEE CONTENTS STATEMENT ELSEWHERE ON LABEL

VAPOR HARMFUL. Use only with adequate ventilation. This product must be used with an appropriate catalyst. Follow the respirator requirement and instructions on the catalyst.

Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.

FIRST AID

If **INHALED**:	If affected, remove from exposure. Restore breathing. Keep warm and quiet.
If on **SKIN**:	Wash affected area thoroughly with soap and water. Remove contaminated clothing. Launder before re-use.
If in **EYES**:	Flush eyes with large amounts of water for 15 minutes. Get medical attention.
If **SWALLOWED**:	Get medical attention immediately.

SPILL AND WASTE

Remove all sources of ignition. Ventilate and remove with inert absorbent. Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulation regarding pollution.

DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Contains solvents which can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal. This product must be mixed with other components before use. Before opening the packages, **READ AND FOLLOW WARNING LABELS ON ALL COMPONENTS.** WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

DO NOT TAKE INTERNALLY
KEEP OUT OF THE REACH OF CHILDREN
FOR INDUSTRIAL USE ONLY
SEE MATERIAL SAFETY DATA SHEET

CAS No	Ingredient
[illegible]	Titanium Dioxide
[illegible]	Methylene Amyl Ketone
[illegible]	Fractionated Vegetable Oil
[illegible]	Acrylic Polymer
[illegible]	Toluene

E★19 NON-PHOTOCHEMICALLY REACTIVE

0 35777 24680 1

H HEALTH	2
F FLAMMABILITY	3
R REACTIVITY	0
PERSONAL PROTECTION	

The Sherwin-Williams Company
Environmental, Health & Regulatory Services
101 Prospect Avenue, N.W.
Cleveland, Ohio 44115-1075
Facsimile: (216) 566-2730

Document by E-mail to jnyarady@arb.ca.gov and
Document with Attachments by FEDERAL EXPRESS NO. 8187 1626 1466

April 7, 2000

Mr. Jim Nyarady
Manager, Strategy Evaluation Section
Stationary Source Division
California Air Resources Board
2020 L. Street
P. O. Box 2815
Sacramento, CA 95812

Dear Mr. Nyarady,

The Sherwin-Williams Company is pleased to have this opportunity to comment on the Draft Program Environmental Impact Report (EIR) for the proposed Suggested Control Measure for Architectural Coatings (SCM). The Sherwin-Williams Company is one of the largest coating manufacturers in the world, with 1999 annual sales of over five billion dollars. We maintain manufacturing facilities throughout the country, including several within the State of California. We maintain company-owned and operated Stores throughout the country. These are the exclusive distributors / retailers for the Sherwin-Williams brand. In addition to this distribution, our products, under a variety of additional brand names, are distributed through mass merchandisers, do-it-yourself outlets, hardware stores, and by independent distributors. Our product lines include some of the best known brands in the marketplace, including Minwax®, Thompsons®, Pratt & Lambert®, Martin-Senour®, Dutch Boy®, Krylon®, Rust Tough®, Cuprinol®, Red Devil®, and Formby's®. In the architectural and industrial maintenance product areas these coatings are used for their decorative and protective properties.

AVERAGING

Although in earlier discussions the ARB seemed committed to developing an Averaging Provision for the SCM, the EIR states that the ARB will not be including such a Provision with the current proposal. Although the ARB formed an averaging committee to develop a useful averaging program, only two meetings were held (one of which was originally scheduled as a Working Committee meeting for the South Coast Air Quality Management District (SCAQMD). While the EIR notes that there are difficulties in developing such a program, the ARB has not held the additional meetings needed to discuss and resolve these difficulties. We note that without such a provision, the proposed Suggested Control Measure is more restrictive than the rules adopted by the SCAQMD – the only District in the country ranked as Severe for ozone nonattainment by the U. S. Environmental Protection Agency.

9b-1

We believe the ARB should postpone the Hearing on the proposed SCM until an Averaging Program can be developed.

ADMINISTRATIVE ISSUES

Rust Preventative Coatings

The ARB proposed SCM precludes the industrial use of rust preventative coatings, even when the VOC content of the rust preventative coating meets the industrial maintenance limit. This does not make sense since if the VOC content meets the industrial maintenance limit, no additional emissions would result in such usage. Section 3.7 should be changed to the wording found in the 12/1/99 proposal:

9b-2

> Rust Preventative Coatings: Effective January 1, 2004, no person shall apply or solicit the application of any rust preventative coating for industrial use, unless such a rust preventative coating complies with the industrial maintenance coatings VOC limit.

Sell Through of Coatings

Section 3.3 needs to have a sentence added to allow the use of coatings manufactured prior to the effective date of the rule. Such use should be for an indefinite period of time, since if the product can not legally be used, disposal would be needed. In the State of California even latex paints are classified as hazardous wastes. Thus, we recommend that for the full life of the product, it be allowed used up rather than be required to be sent for hazardous waste disposal. We recommend the following sentence be added to Section 3.3:

9b-3

> A coating manufactured prior to the effective date specified for that coating in Table 1 may be used and applied.

SPECIFIC CATEGORY AND LIMIT CONCERNS

Floor Coatings

Appendix D provides a description of the floor coating category as, "a variety of high performance clear or opaque coatings." However, the definition for the category included in the 2/11/00 proposal states, "An opaque coating ...." We consider it to be critically important to only include opaque coatings in this category. The alternative would include floor varnishes, stains, etc. which have different performance and VOC requirements and which are already covered under other categories.

9b-4

Appendix D states that there are only limited residential applications in the floor coating category and that the majority of the usage is in commercial and industrial applications. As such, we believe our proposal for this category to be divided into two sub-categories should be considered an acceptable alternative that will provide the needed performance and safety requirements for the residential user, as well as the professional user in more industrial sites.

9b-5

The Sherwin-Williams Company considers multi-component systems to be inappropriate and too hazardous for nonprofessional application in residential settings. Most of the paint manufacturers agree that multi-component systems are not appropriate for residential use. An example of the hazards of such products is shown on the attached Material Safety Data Sheet (MSDS) (Attachment 1) and the Product Data Sheet (Attachment 2) for the Sherwin-Williams Armor Seal 650 SL/RC product line, which is included in Appendix E, Table E-9 on Floor Coatings. This product is part of our Industrial Maintenance product line. The MSDS for this product warns that any of the hardeners may cause **burns** on contact with skin or eyes. For this reason, this is not a product which we would recommend for nonprofessional users. The Product Data Sheet recommends uses for the product as "clean rooms, aircraft hangars, laboratories, workshops and light assembly areas" and only for concrete or steel surfaces. In no way does the Product Data Sheet indicate a residential use.

We would like to contrast this information to our Acrylic Latex Floor Enamel which is intended for use by non-professionals in residential setting. The Product Data Sheet (Attachment 3) and MSDS
5 (Attachment 4) for this product are attached and show no "noteworthy" hazards. It is obvious from the data sheet that this product is recommended for residential uses, such as floors, steps, concrete, wood, and steel, and that the product can easily be applied in a safe manner.

Appendix E lists only two products that are not multi-component coatings and which, based on the delineations used by most of the industry, might be considered appropriate for residential use. Of these, the Benjamin Moore product is not a floor coating (see our letter of 3/24/00). This means that there is only one product included in the EIR which is appropriate for non-professional use in residential settings being included in the evaluation of the Floor Coating category and which could
9b-6 comply with the proposed limit.

An evaluation of the product information obtained by ARB on the remaining products shows the following:

Advance Polymer Systems Guardline Concrete Corrosion Resistant (Siloxirane) system is a multi-component system only recommended for concrete. The shortness of the pot life makes it less practical than average for use by a non-professional user.

The Ameron PSX® 700 product data sheet included in the response to the FOIA request provides typical uses of steel, concrete walls and floors, and inorganic zinc silicate coated surfaces on bridges, marine decks and boottops, tanks, piping, power plants, pulp and paper facilities, rail cars, vehicles (e.g. buses and trucks) – it does not indicate any residential type use. The data sheet for this multi-component siloxane specifically notes "For professional use only" and not recommended for residential use. The MSDS(Attachment 5) recommends the following protective clothing and equipment: "...wear resistant coverall, gloves, and show coverings to prevent skin contact. Wear solvent resistant glasses with splash guards or face shield to protect eyes from splash, spatter, an/or spray mist..." None of this personal protection equipment is typically owned or used by residential users.

Air Products' Adura 50 Polyol and Adura 100 Polyol are Industrial Coating Resins which, when combined with other ingredients can form one part of a multi-component coating system. The other component needed to form the coating film must be an isocyanate. A typical recommended isocyanate is Bayer's Desmodur N-3300. The MSDS for this product is included (Attachment 6) and clearly shows that this material is totally inappropriate for use by untrained non-professional users. Air monitoring is recommended, as is medical surveillance of all persons handling or coming into contact with this material. Note that the Employee Protection section of the MSDS is 4 pages long, clearly indicative of the care that must be utilized in handling an isocyanate compound.

The three Coatings Resource Corp. products listed are all shown as Industrial Coatings. On each of the data sheets the following statement is made, clearly indicating that these products are not for use by non-professionals: "FOR INDUSTRIAL USE BY PROFESSIONAL APPLICATORS ONLY. NOT INTENDED FOR SALE TO THE GENERAL PUBLIC."

These are just a few examples of the fact that most, if not all, of the coating manufacturers consider multi-component coatings for use only by professionals. Depending on the specific chemistry of the

products, most coating manufacturers will not recommend under any circumstances specific chemistries for use in residential settings even by professional users.

At the Workshop on 3/16/00, Mr. Greg Allen of ARB staff mentioned that he had found additional floor coatings that would meet the proposed VOC content limit of 100 g/l and which would be appropriate for residential use. We have received information from Mr. Allen on twelve coatings, which are presumably the products he referred to.

9b-7 The following table outlines the information provided and our concerns with using such information to support a 100 g/l VOC content limit for all floor coatings:

Table 1: Data on Additional Floor Coatings*

Product	Concern
SealKrete Skid-Proof EZ Coat (Attachment 7)	Neutral, not opaque. As such, does not qualify as floor coating Recommends mixing (by mechanical shaker) of a paint to add color – shakers are equipment not found in most residential settings. Recommends etching with muratic acid, followed by a pH determination – not activities typical of residential users Requires a minimum of 2 coats, after application of a sealer
SealKrete Proformance Skid-Proof	Neutral, not opaque. As such, does not qualify as floor coating Application is only by trowel, spray hopper or larger textured sprayer – equipment that is not familiar to nonprofessional users. Recommends mixing with a blade mixer of a paint to add color – equipment not found in most residential settings. Only covers 150 sq ft per 10 lb pail (probably 10 lb pail is about 1 gallon)
SealKrete Commercial Floor Sealer HS	This is described as a clear sealer and does not meet the definition for a floor coating.
SnowProof Systems Safe-T-Prime	This is described as a rubber primer and does not meet the definition for a floor coating.
SnowProof Systems Safe-T-Kote	Recommended for roofs and thus does not meet the definitional limitations of a floor coating The MSDS states "An eyewash and safety shower should be nearby and ready for use." Neither of these are available in residential settings.
Jasco -	Special handwritten note states there is a new product "Stop Slip Floor Coating" with a low VOC. However, no information on this product appears available. Rule making should not be based on such flimsy information.
Sherwin-Williams Armorseal 1000 HS (Attachment 8)	This product is an industrial maintenance and marine coating. The label states, "For hulls, decks, tanks and superstructures of marine vessels. For masonry and steel structures, storage tanks, pipes, machinery and equipment, concrete floors, etc., in marine and industrial environments." – these are not floors. The label states, "Not for Residential Use" and "For Professional Use Only."
Litex 2-part Epoxy Waterbased Floor Ctg	Two-component epoxy – not appropriate for non-professional users. Very little information was provided, including no VOC information, no MSDS.
Litex 2-part Epoxy Waterbased Rubber Floor Ctg	Two-component epoxy – not appropriate for non-professional users. Very little information was provided, including no VOC information, no MSDS Seems to be recommended for concrete surfaces, not for general purpose, wood porches, etc.
Litex 2-part Epoxy Waterbased High Gloss Clear	This is a clear coating, and thus does not meet definition of floor coating. Very little information was provided, including no VOC information, no MSDS.
Litex 2-part Epoxy Waterbased Concrete Stain	As a stain, this is not opaque and thus not a floor coating. Very little information was provided, including no VOC information, no MSDS.
Epoxi-Tech Epoxy Shield	This claims to be a garage floor coating, nothing else. Very little information was provided, including no VOC information, no MSDS.

*From data sheets and other information supplied by Greg Allen, ARB staff, on additional Floor Coatings to meet the proposed VOC limit.

9b-7

9b-8 Thus, with all of the data accumulated by the ARB, only one coating product which would be appropriate for use by non-professionals in residential settings was found with a VOC content to comply with the proposed 100 g/l limit. This is an inadequate basis for establishing a limit which will essentially require residential users to be exposed to hazardous chemicals.

9b-9 The Sherwin-Williams Company recommends the Floor Coating category be divided into 2 categories: one for industrial and commercial use and one for residential use, with VOC contents of 100 and 250 g/l respectively, with the following definitions:

Floor Coating- Multi-Component: A floor coating requiring the addition of a separate reactive resin, commonly known as a catalyst or hardener, before application to form an acceptable dry film.

Floor Coating – Single Component: A floor coating that is ready for application as it comes out of its container to form an acceptable dry film. Thinner , that may be necessary to reduce the viscosity, and skid preventative additives are not considered a component.

Primers, Sealers, And Undercoaters

Exterior Wood Primers, Sealer, and Undercoaters

9b-10 As discussed during the 3/16/00 Workshop and now confirmed, the primers and undercoaters recommended by The Sherwin-Williams Company for use on wood and composition board under all exterior latex coatings are consistently solvent borne with a VOC content of 350 g/l. We have reviewed all of the Sherwin-Williams product data sheets and have found only one product line where a latex primer is recommended: the LowTemp 35™ product line recommends the LowTemp 35™ Exterior Latex Primer for application over wood and composition board. However, since this is a unique system, we do not generally recommend this primer for use on wood and composition board under our other exterior latex coatings. Product Data Sheets for all of the exterior latex systems are enclosed. (Attachments 9-22)

We want to stress that the concerns with wood and composition board are not limited to stains bleeding through from the substrate. While that is a significant problem with waterborne coatings on certain woods (e.g. redwood, cedar, etc.), it is less of a problem with composition board. However, composition board frequently has a wax-type of material bleeding out. Unless sealed by a solvent borne primer, this wax will appear as unsightly dark patches on the finish. We recommend the following category be added with a 350 g/l limit:

Exterior wood primer, sealer, and undercoater: A primer, sealer, or undercoater formulated and recommended for use exclusively on exterior wood.

Interior Wood Sealers

9b-11 The lowering of the VOC limit for sealers and quick dry sealers to 200g/l will force these mineral spirits based products to either raise solids or use alternative exempt solvents. The use of acetone is unacceptable due to the highly flammable nature of this solvent. The use of Oxol 100 is prohibitively expensive. (Even if t-butyl acetate is approved an exempt solvent, its usefulness in consumer coatings will be severely restricted due to its offensive odor.) The increase of solids is not feasible due to the significantly higher brush drag, thicker films, and longer dry-time which would result. In addition, cost would be increased significantly (approximately 100%) while performance would become unacceptable. If it were possible to formulate such a solventborne coating, the increase in film

thickness would cause a corresponding decrease in coverage and result in no reduction in VOC emissions.

Compliance with the proposed limit of 200 g/l would force solvent borne sealers to become cost prohibitive, less efficacious, or potentially dangerous, and would effectively ban all performing products in this category.

9b-11 The only remaining alternative to solvent borne interior wood sealers would be water borne sealers. While presently on the market, these products are less efficacious for three important reasons.

1. The first is the negative impact waterborne sealers have on grain raise. When water is applied to bare wood surfaces, wood fibers swell and create a rough feel and appearance. Any steps taken to alleviate this effect such as sanding will increase the cost job. In addition, the harm to the wood is not eliminated by sanding of the surface.

2. The second reason is the impact of panelization. In areas where fluctuations of humidity cause the expansion and contraction of wood (such as, flooring) - even after sealing and topcoating - water borne sealers can cause the wood boards to become glued together. As the wood naturally expands and contracts (with humidity and temperature variations), large cracks will appear in the flooring as a result of being glued. Solvent borne sealers do not panelize wood (flooring).

3. The final reason is waterborne sealers are more expensive than solvent borne sealers.

The remedial action required after panelization of a floor is the complete replacement of the floor. This is an enormous expense. In addition to the expense of the new floor, removal of all objects would be needed to prevent dust accumulation in crevices: all surfaces, all furniture, all appliances, including clothing, pictures, personal belongings, light fixtures, appliances, window treatments, etc. - to new building emptiness would be needed. This "inconvenience" would be extremely costly.

Interior Wood Sealer: A coating formulated and recommended for the application to interior wood surfaces to prevent absorption by the substrate of stains: to prevent harm to the wood; to prevent staining of the wood by outside agents; to prevent dirt from getting into the wood; to prevent subsequent coatings from being absorbed by the substrate, or to prevent harm to subsequent coatings by material in the substrate.

Stains

The current CARB definition excludes concrete stains, by defining stains as wood coatings. This needs to be changed by deleting the word "wood." No previous rule has ever limited the stain category 9b-12 to coatings for wood and there is no reason why this restriction should be placed on this category. We offer such a concrete stain line in our H&C® product line.

We recommend the following definition:

Stain: *An opaque clear, or semitransparent coating formulated to change the color of a surface but not conceal the grain pattern or texture, including lacquer stains.*

Interior Wood Stains

9b-13 Although Appendix D of the EIR states that Sherwin-Williams, Performance Coatings, FSM Corporation, PPA Technologies, and Sierra Performance Coatings have stains available with VOC contents less than the proposed 250 g/l, products from none of these companies are listed in Table E-27 of Appendix E. Appendix D also states that PPA Technologies, Fuhr Research Laboratories, and Sierra Performance Coatings have interior wood stains which comply with the proposed 250 g/l limit. However, no products from these companies are shown inTable E-27. In addition, the documents received in response to the FOIA request included no product literature for any semi-transparent complying stains for interior wood. The only semi-transparent stain product recommended for interior wood was the Deft Stain, which is for both interior and exterior use, but for which no VOC information was received. We believe such vague representations are an inadequate basis for a rule.

9b-14 The lowering of the limit for stains to 250 g/l is an effective ban of solvent borne stains. The same arguments against the use of exempt solvents and of increased solids discussed for interior wood sealers apply to these stains: acetone too highly flammable, Oxol 100 is prohibitively expensive, and t-butyl acetate (if exempted) has an unacceptable odor.

9b-15 Alternative water borne interior wood stains pose several problems in addition to those discussed for water wood sealers, when compared to the solvent borne interior semitransparent wood stains they are meant to replace. While the effect of grain raising caused by water borne stains is the same as for water borne sealers, sanding is not a viable option for stains. This is due to the potential removal of color, which will be caused by sanding. To avoid this color removal, sanding must occur after sealing or subsequent topcoating (with varnish or lacquer). This can cause entrapment of microfoam in the middle coats. This microfoam can not be removed when the raised grain is finally sanded.

Lapping is another problem attributed to water borne interior wood stains. Larger areas such as floors are prone to lap marks caused by the fast drying of such stains and subsequent overlapping of the stain during application. The only remedy for lap marks is a full re-sanding of the floor. As discussed above, this is expensive and distressing since it reduces the long term service life of the wood floor (sanding the floor removes a layer of the wood; a floor can only be sanded about three or four times before there is not enough wood left to avoid nails and to maintain its integrity. Thus, the full replacement expense of the floor can be divided by 3 or 4 to determine the cost of removing a wood layer by sanding – in addition to the direct costs of the sanding and coating re-applications.)

Even water-borne stains include the use of VOC solvents to extend dry times. Reducing the VOC limit to 250g/l would cause water borne stain formulas to dry even faster, enhancing the potential for lapping problems. The longer dry time provided by currently compliant oil based stains prevent lap marks from forming.

9b-16 We recommend the limit for interior wood stains be maintained at 350 g/l.

> ***Interior Semi-Transparent Stain:*** *A coating formulated for interior use only that produces a dry film with minimal coloring and that does not completely conceal the substrate or its natural texture or grain pattern.*

<u>Industrial Maintenance Tank Lining and Pipe Coatings</u>

9b-17 While many performance requirements included in the Industrial Maintenance category may be satisfied at the 250 g/l level, the one area of concern is the tank lining and pipe coating group of

products. These need a higher limit. This category would replace the "chemical storage tank coating" category that was added to SCAQMD Rule 1113.

We recommend the following definition:

9b-17 *Tank Lining and Pipe Coating: An industrial maintenance coating formulated and recommended for application to the interior surfaces of storage tanks and reservoirs and associated piping exposed to immersion in water, wastewater, organic solvents and chemical solutions (aqueous and non aqueous solutions).*

If additional information is needed, please feel free to contact me by telephone at (216) 566-2630, by facsimile at (216) 263-8635, or by electronic mail at mkharding@sherwin.com.

Sincerely,

Madelyn K. Harding Administrator,
Product Compliance & Registrations

G:\VOCREGS\C A R B\A I M Model Rule\SW Comments\Draft Env Impact Rpt comments.doc

18 — Section 1 — Product Identification

Material Safety Data Sheet

The Sherwin-Williams Co.
101 Prospect Ave. N.W.
Cleveland, OH 44115

Emergency telephone number (216) 566-2917
Information telephone number (216) 566-2902
Date of preparation December 23, 1998

©1998, The Sherwin-Williams Co.

ARMORSEAL™ 650SL 100% Solids, Self-Leveling Epoxy — AS-650

CAS No.	Hazardous Ingredients (percent by weight)	ACGIH TLV <STEL>	OSHA PEL <STEL>	Units	Vapor Pressure (mm Hg)	B58 VQ650 Clear	B60 VQ650 Hardener for Clear	B58 WQ651 White	B60 VQ651 Hardener for White	B58 AQ655 Haze Gray	B58 AQ656 Deck Gray	B58 RQ657 Red	B58 HQ658 Sandstone	B60 VQ655 Hardener for Colors	B58 DQ550 Hi-Build Additive
100-51-6	Phenylmethanol	Not Established			1.0		> 20		> 20					30 - 40	
25154-52-3 §	Nonylphenol	Not Established					< 10		< 10						
98-54-4	Paratertiarybutylphenol	Not Established												1	
140-31-8	Aminoethylpiperazine	Not Established					< 10		< 10						
Unknown	Epoxy Polymer	Not Established				87		54		49	54	54	46		
Unknown	Polyamines	Not Established					40 - 60		50 - 60					30	
Unknown	Amine	Not Established												1	
2855-13-2	Isophorone Diamine	Not Established			0.02									8	
1761-71-3	Methylene Dicyclohexylamine	Not Established												3	
14808-60-7	Quartz	0.1	0.1	Mg/M3	as Resp. Dust			22		33	34	27	30		92
14807-96-6	Talc	2	2	Mg/M3	as Resp. Dust			2		2	2	2	11		8
13463-67-7	Titanium Dioxide	10	10[5]	Mg/M3	[Resp. as Dust Fraction]			16			4				
65997-17-3	Glass	5		Mg/M3									7		
1333-86-4	Carbon Black	3.5	3.5	Mg/M3							0.2				
	Weight per Gallon (lbs.)					9.7	8.3	13.0	7.7	12.3	12.1	12.6	12.3	8.5	22.2
	Photochemically Reactive					No	No	No	No	No	No	No	No	No	No
	HMIS (NFPA) Rating (health - flammability - reactivity)					2* - 0 - 0	3* - 1 - 1	2* - 0 - 0	3* - 1 - 1	2* - 0 - 0	2* 1 0	2* - 0 - 0	2* - 0 - 0	3* - 1 - 0	2* - 0 - 0

PERCENT BY WEIGHT

§ Ingredient subject to the reporting requirements of the Superfund Amendments and Reauthorization Act (SARA) Section 313, 40 CFR 372.65 C

→→→ *MSDS Text Page Follows* →→→

ARMORSEAL™ 650SL 100% Solids, Self-Leveling Epoxy

ection 3 — Physical Data

RODUCT WEIGHT	see TABLE	EVAPORATION RATE	Slower than Ether
PECIFIC GRAVITY	0.93-2.67	VAPOR DENSITY	Heavier than Air
OILING POINT	N.Av.	MELTING POINT	N.A.
OLUBILITY IN WATER	N.A.		

ection 4 — Fire And Explosion Hazard Data

LAMMABILITY CLASSIFICATION FLASH POINT Not Applicable LEL N.A. UEL N.A.
Not Applicable
XTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Foam
NUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers may explode (due to the buildup of pressure) when exposed to extreme heat
PECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used. ater spray may be ineffective. If water is used, fog nozzles are preferable. Water may be sed to cool closed containers to prevent pressure build-up and possible autoignition or xplosion when exposed to extreme heat.

ection 5 — Health Hazard Data

OUTES OF EXPOSURE
Exposure may be by INHALATION and/or SKIN or EYE contact, depending on conditions of use. o minimize exposure, follow recommendations for proper use, ventilation, and personal rotective equipment.
CUTE Health Hazards
FFECTS OF OVEREXPOSURE
Irritation of eyes, skin and respiratory system. B60VQ650, B60VQ651 and B60VQ655 may cause urns on contact with skin or eyes.
IGNS AND SYMPTOMS OF OVEREXPOSURE
Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure o vapors or spray mists.
Redness and itching or burning sensation may indicate eye or excessive skin exposure.
EDICAL CONDITIONS AGGRAVATED BY EXPOSURE
May cause allergic skin reaction in susceptible persons.
MERGENCY AND FIRST AID PROCEDURES
f INHALED: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
f on SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.
f in EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
f SWALLOWED: For B60VQ650, B60VQ651 and B60VQ655 alone -- Never give anything by mouth to an unconscious person. DO NOT INDUCE VOMITING. Give several glasses of water. Seek medical attention.
For other products and catalyzed product -- Get medical attention.
HRONIC Health Hazards
Carbon Black is classified by IARC as possibly carcinogenic to humans (group 2B) based on xperimental animal data, however, there is insufficient evidence in humans for its arcinogenicity.
Crystalline Silica (Quartz, Cristobalite) is listed by IARC and NTP. Long term exposure to igh levels of silica dust, which can occur only when sanding or abrading the dry film, may ause lung damage (silicosis) and possibly cancer.
Rats eposed to titanium dioxide dust at 250 mg./m3 developed lung cancer, however, such xposure levels are not attainable in the workplace.

ection 6 — Reactivity Data

TABILITY – Stable
ONDITIONS TO AVOID
None known.
NCOMPATIBILITY
None known.
AZARDOUS DECOMPOSITION PRODUCTS
By fire: Carbon Dioxide, Carbon Monoxide, Oxides of Nitrogen, possibly of Hydrogen Cyanide
AZARDOUS POLYMERIZATION – Will Not Occur

Section 7 —Spill or Leak Procedures

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate and remove with inert absorbent.
WASTE DISPOSAL METHOD
Waste from these products is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section 8 —Protection Information

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation. Avoid breathing vapor. Do not permit contact with ski and eyes. Wash hands after using.
These coatings may contain materials classified as nuisance particulates (listed "as Dust" Section II) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section II, the applicable limits for nuisance dusts are ACGIH TLV 10 mg./m3 (total dust), 3 mg./m3 (respirable fraction), OSHA PEL 15 mg./m3 (total dust), 5 mg./m3 (respirable fraction).
VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section II is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.
RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section II.
When sanding, wirebrushing, abrading, burning, or welding the dried film, wear a particulat respirator approved by by NIOSH/MSHA for protection against non-volatile materials in Section II.
PROTECTIVE GLOVES
To prevent skin contact, wear neoprene gloves which are recommended by glove supplier for protection against materials in Section II.
EYE PROTECTION
To prevent eye contact, wear neoprene safety spectacles with unperforated sideshields.
OTHER PROTECTIVE EQUIPMENT
To prevent skin contact, use of barrier cream on exposed skin is recommended.

Section 9 —Precautions

DOL STORAGE CATEGORY – 3B
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.
OTHER PRECAUTIONS
These products may be mixed with other components before use. Before opening the packages, READ AND FOLLOW WARNING LABELS ON ALL COMPONENTS.
Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

Section 10 —Other Regulatory Information

CALIFORNIA PROPOSITION 65
WARNING: B58AQ655, B58AQ656, B58DQ550, B58HQ658, B58RQ657, B58WQ651 contain a chemical kno to the State of California to cause cancer.
TSCA CERTIFICATION
All chemicals in these products are listed, or are exempt from listing, on the TSCA Inventor

The above information pertains to these products as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to these products may substantially alter the composition and hazards of the products. Since condition of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

SHERWIN WILLIAMS®

Heavy Duty Floor Coatings

8.25

ARMORSEAL® 650 SL/RC

SELF-LEVELING/RECOATABLE EPOXY

PART A	B58Q	SERIES
PART B	B60VQ655	HARDENER FOR COLORS
PART B	B60VQ650	HARDENER FOR CLEAR
PART B	B60VQ651	HARDENER FOR WHITE

PRODUCT INFORMATION

Revised 1/2000

PRODUCT DESCRIPTION

ARMORSEAL 650SL/RC SELF-LEVELING/RECOATABLE EPOXY is a 2 component, high performance floor system that provides a high gloss, seamless, hygienic surface that is extremely hard wearing and durable. The coating can also be applied to provide a nonslip texture. This product may be topcoated if required.

- Suitable for use in USDA inspected facilities
- Chemical Resistant
- Impact Resistant
- Abrasion Resistant

RECOMMENDED USES

ArmorSeal 650 SL/RC is especially suited for clean rooms, aircraft hangars, laboratories, workshops and light assembly areas.

The product can be applied at thicknesses from 10.0 to 30.0 mils dft.

When a urethane or additional epoxy topcoat is required.

PRODUCT CHARACTERISTICS

Finish: Full Gloss

Color: Clear, Haze Gray, Deck Gray, White, Sandstone, and Tile Red

Volume Solids: 100%, mixed

VOC (calculated): 0 g/L; 0.0 lb/gal, mixed

Mix Ratio: 2 component, premeasured

Recommended Spreading Rate per coat:

Wet mils:	10.0 - 30.0
Dry mils:	10.0 - 30.0
Coverage:	50 - 160 sq ft/gal approximate

Drying Schedule 10.0 mils wet @ 50% RH:

	@ 55°F	@ 72°F	@ 95°F
To touch:	16-24 hours	6 - 12 hours	4-8 hours
To recoat:			
minimum:	36 hours	8 hours	6 hours
maximum:	72 hours	72 hours	72 hours
Foot Traffic:	48 hours	24 hours	18 hours
Heavy Traffic	96 hours	72 hours	60 hours
To cure:	7 days	7 days	7 days
Pot Life:	60 minutes	40 minutes	20 minutes
Sweat-in-Time:	none required	none required	none required

Drying time is temperature, humidity, and film thickness dependent. Abrade surface if recoating after 72 hours.

Shelf Life: 18 months, unopened, at 72°F

Flash Point: 200°F, PMCC, mixed

Reducer/Clean Up: Reducer #54, R7K54, clean up only

PERFORMANCE CHARACTERISTIC

- Abrasion resistant
- Excellent adhesion properties
- Chemical resistant
- Impact resistant
- Self - leveling properties
- Provides a seamless-high build durable coating
- Solvent resistant
- Dry heat resistance: 200°F

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SHERWIN WILLIAMS®

Heavy Duty Floor Coatings

8.25

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PRODUCT INFORMATION

RECOMMENDED SYSTEMS

Concrete:
1 ct. ArmorSeal 33 Primer @ 8.0 mils dft
1 ct. ArmorSeal 650 SL/RC @ 10.0 - 30.0 mils dft

Concrete:
1 ct. ArmorSeal Water Based Epoxy Primer @ 2.0 - 3.0 mils dft
1 ct. ArmorSeal 650 SL/RC @ 10.0 - 30.0 mils dft

Concrete:
1 ct. ArmorSeal Floor-Plex Primer @ 1.5 - 2.0 mils dft
1 ct. ArmorSeal 650 SL/RC @ 10.0 - 30.0 mils dft

Steel:
1 ct. Recoatable Epoxy Primer @ 4.0 - 5.0 mils dft
1 ct. ArmorSeal 650 SL/RC @ 10.0 - 30.0 mils dft

The systems listed above are representative of the products use, other systems may be appropriate.

SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Refer to product application Bulletin for detailed surface preparation information.

Minimum recommended surface preparation:
* Iron & Steel: SSPC-SP6
* Concrete & Masonry: SSPC-SP13/NACE 6
* Primer required

COLOR AVAILABILITY

Do not tint.

Color: Clear, Haze Gray, Deck Gray, White Sandstone, and Tile Red

APPLICATION CONDITIONS

Temperature:	55°F minimum, 95°F maximum (air, surface, and material)
	At least 5°F above dew point
Relative humidity:	85% maximum

Refer to product Application Bulletin for detailed application information.

ORDERING INFORMATION

Packaging:	1 gallon and 5 gallon units
Weight per gallon:	10.4 ± 0.2 lb, mixed

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

SHERWIN Williams®

Heavy Duty Floor Coatings

8.25A

ARMORSEAL® 650 SL/RC

SELF-LEVELING/RECOATABLE EPOXY

PART A	B58Q	SERIES
PART B	B60VQ655	HARDENER FOR COLORS
PART B	B60VQ650	HARDENER FOR CLEAR
PART B	B60VQ651	HARDENER FOR WHITE

APPLICATION BULLETIN

Revised 1/2000

SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Poured Concrete
New
For surface preparation, refer to SSPC-SP13/NACE 6. Surface must be clean, dry, sound, and offer sufficient profile to achieve adequate adhesion. Minimum substrate cure is 28 days at 75°F. Remove all form release agents, curing compounds, salts, efflorescence, laitance, and other foreign matter by sandblasting, shotblasting, mechanical scarification, or suitable chemical means, such as muriatic acid etch, refer to ASTM D4260. Rinse thoroughly to achieve a final pH between 6.0 and 10.0. Allow to dry thoroughly prior to coating.

Old
Surface preparation is done in much the same manner as new concrete; however, if the concrete is contaminated with oils, grease, chemicals, etc., they must be removed by cleaning with a strong detergent. Refer to ASTM D4258. Form release agents, hardeners, etc. must be removed by sandblasting, shotblasting, mechanical scarification, or suitable chemical means. If surface deterioration presents an unacceptably rough surface, ArmorSeal Crack Filler is recommended to patch and resurface damaged concrete.
Fill all cracks, voids and bugholes with ArmorSeal Crack Filler.

Always follow the ASTM methods listed below:
ASTM D4258 Standard Practice for Cleaning Concrete.
ASTM D4259 Standard Practice for Abrading Concrete.
ASTM D4260 Standard Practice for Etching Concrete.
ASTM D4263 Plastic Sheet Method for Checking Moisture in Concrete.
SSPC-SP 13/Nace 6 Surface Preparation of Concrete

Iron & Steel
Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. Minimum surface preparation is Commercial Blast Cleaning per SSPC-SP6. For better performance, use Near White Metal Blast Cleaning per SSPC-SP10. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2 mils). Prime any bare steel the same day as it is cleaned.

Previously Painted Surfaces:
If in sound condition, clean the surface of all foreign material. Smooth, hard or glossy coatings and surfaces should be dulled by abrading the surface. Apply a test area, allowing paint to dry one week before testing adhesion. If adhesion is poor, additional abrasion of the surface and/or removal of the previous coating may be necessary. Retest surface for adhesion. If paint is peeling or badly weathered, clean surface to sound substrate and treat as a new surface as above.

APPLICATION CONDITIONS

Temperature:	55°F minimum, 95°F maximum (air, surface, and material) At least 5°F above dew point
Relative humidity:	85% maximum

APPLICATION EQUIPMENT

Reducer/Clean Up: ..... Reducer #54, R7K54, clean up only

Roller
Cover ..... 3/8" woven with phenolic core
Reduction ..... not recommended

Trowel ..... Acceptable
Reduction ..... not recommended

Squeegee ..... Acceptable
Reduction ..... not recommended

Spike Roller ..... Required

If specific application equipment is listed above, equivalent equipment may be substituted.

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SHERWIN WILLIAMS®

Heavy Duty Floor Coatings

8.25A

ARMORSEAL® 650 SL/RC

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APPLICATION BULLETIN

APPLICATION PROCEDURES

Surface preparation must be completed as indicated.

To mix 1 gallon units: Use electric or air mixer (approximately 250 rpm) with metal mixing blade (Jiffy Model HS or equal). Premix both components for 1-2 minutes, then pour hardener contents into slack-filled resin can. Mix for 2 to 3 minutes, moving blade around can while mixing. Avoid whipping in air while mixing. To mix 5 gallon units use same procedure as mixing 1 gallon units except a larger blade (Jiffy Model ES or equal) is required.

With material freshly mixed, working out of a paint pan or bucket, roll material on floor to desired thickness with a 3/8" nap soft woven roller or equivalent. Check film thickness frequently. After 20-30 minutes setup time, material should be rolled with a spiked roller to remove any entrapped air. Do not spike roll after 40 minutes.

If a slip-resistant texture is desired, broadcast a clean, dry 30-50 mesh silica sand into the ArmorSeal 33 Primer coat immediately after application. Broadcast sand until the primer is saturated and only dry sand is showing. After the primer has set (6 hours minimum), sweep excess sand off the surface. Then topcoat with 15-20 mils of ArmorSeal 650 SL/RC. Lower topcoat thickness will produce more pronounced slip-resistant profiles, heavier topcoats will produce smoother profiles. Spike rolling is not necessary when ArmorSeal 650 SL/RC is applied as a slip-resistant coating.

Recommended Spreading Rate per coat:

Wet mils:	10.0 - 30.0
Dry mils:	10.0 - 30.0

Drying Schedule 10.0 mils wet @ 50% RH:

	@ 55°F	@ 72°F	@ 95°F
To touch:	16-24 hours	6 - 12 hours	4-8 hours
To recoat:			
minimum:	36 hours	8 hours	6 hours
maximum:	72 hours	72 hours	72 hours
Foot Traffic:	48 hours	24 hours	18 hours
Heavy Traffic	96 hours	72 hours	60 hours
To cure:	7 days	7 days	7 days
Pot Life:	60 minutes	40 minutes	20 minutes
Sweat-in-Time:	none required	none required	none required

Drying time is temperature, humidity, and film thickness dependent.
Abrade surface if recoating after 72 hours.
Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance.

PERFORMANCE TIPS

Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness or porosity of the surface, skill and technique of the applicator, method of application, various surface irregularities, material lost during mixing, spillage, overthinning, climatic conditions, and excessive film build.

No reduction of material is recommended as it can affect film build, appearance, and adhesion.

Do not apply the material beyond recommended pot life.

Do not mix previously catalyzed material with new.

When recoating ArmorSeal 650 SL/RC it must be done no less than 8 hours and no more than 72 hours after applying the first coat. If this "window" has passed, the surface of the cured ArmorSeal 650 SL/RC must be abraded to ensure the adhesion of subsequent coats.

When coating previously painted surfaces, always apply a test patch and examine for lifting and proper intercoat adhesion. If lifting occurs, remove the old coating or apply an appropriate barrier coat.

Refer to Product Information sheet for additional performance characteristics and properties.

CLEAN UP INSTRUCTIONS

Clean spills and spatters immediately with Reducer #54, R7K54. Clean tools immediately after use with Reducer #54, R7K54. Follow manufacturer's safety recommendations when using any solvent.

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

107.02

SHERWIN WILLIAMS

ACRYLIC LATEX FLOOR ENAMEL

A24 SERIES

CHARACTERISTICS

Use for:
- interior
- exterior
- floors, steps
- moldings

Use on:
- Concrete
- Wood
- Steel

Outstanding Features:
- Hard, durable finish
- Excellent for floors and other surfaces
- Uniform low luster appearance
- Easy to apply
- Low Odor

Color:	5 package colors
Coverage:	
Recommended:	400 sq ft/gal @ 4 mils wet; 1.4 mils dry
Drying Time, @ 77°F, 50% RH: temperature and humidity dependent	
Touch:	1 hour
Recoat:	24 hours
Light Foot Traffic:	24 hours
Heavy Foot Traffic:	3 days
Flash Point:	201°F, PMCC
Finish:	15-25 units @ 60°
Solvent/Reducer:	Water
Vehicle Type:	Acrylic
VOC (as packaged):	154-176 g/l (less water) ~~72 grams/liter; 0.60 lb/gal~~
Volume Solids:	34 ± 2%
Weight Solids:	43 ± 2%
Weight per Gallon:	9.7 lb

APPLICATION

Stir thoroughly before use.
Do not apply at temperatures below 50°F.
Brush
No reduction necessary. Use a nylon/polyester brush.
Roller
No reduction necessary. Use a 1/4"-3/4" nap synthetic roller cover.
Pad
No reduction necessary.
Spray—Airless

Pressure	2000 psi
Tip	.017"-.021"
Reduction	up to 1 pint/gallon

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull or scrubbed with an abrasive cleaner.

Concrete and Cement Floors
All surfaces must be cured according to the supplier's recommendations. Remove all form release and curing agents. Patch holes or cracks with an appropriate filler. Concrete must be free of moisture as much as possible (moisture seldom drops below 15% in concrete). Test for moisture or dampness by taping the edges of a 2 foot by 2 foot plastic sheet on the bare surface (an asphalt tile or other moisture impervious material will also do), sealing all of the edges. After 48 hours, inspect for moisture, discoloration, or condensation on the concrete or the underside of the plastic. If moisture is present, the source must be located and the cause corrected prior to painting.
Any area saturated with grease or oil should be covered with dry sand or grease absorbing powder and allowed to sit overnight. Sweep up sand or powder. Scrub the surface using warm water and a powdered commercial cleaner or a degreasing cleaner. Rinse well with clean water. Repeat if oil and grease are not completely removed. Bare concrete should be etched with a 5% Muriatic Acid solution. New concrete should not be etched for at least 30 days. Rinse thoroughly. Neutralize any acid left on the surface with a solution of one gallon of warm water and ½ cup of powdered commercial cleaner. Rinse and allow to dry thoroughly.

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107.02

ACRYLIC LATEX FLOOR ENAMEL

A24 SERIES

SURFACE PREPARATION

Because water will collect in low spots and deposit etching and cleaning residue, it is recommended that the floor be vacuumed to remove any remaining water.

Wood
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Prime interior wood with one coat of PrepRite Wall and Wood Primer, prime exterior wood with A-100 Exterior Oil Wood Primer

Steel
Rust and mill scale must be removed using sandpaper, steel wool or other abrading method. Bare steel must be primed the same day as cleaned. Prime bare steel with one coat of Kem Kromik Universal Metal Primer.

LABEL ANALYSIS
A24W15

Pigment by Weight	19%
Titanium Dioxide	12%
Silica/Silicates	3%
Calcium Carbonate	2%
Organic Polymer	2%
Vehicle by Weight	81%
Acrylic Resin	22%
Water	51%
Glycols	3%
Additives	5%
Total	100%

CAUTIONS

Do not apply at temperatures below 50°F.

HEAVY MACHINERY, CAR OR TUCK TRAFFIC, GAS, OIL, SALT OR INDUSTRIAL CLEANERS MAY CAUSE FAILURE OF THE PAINT FILM. NOT SUITABLE FOR USE ON FLOORS WHERE THERE WILL BE AUTOMOBILE OR TRUCK TRAFFIC.

LABEL CAUTIONS
Contains CRYSTALLINE SILICA
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area.
Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.
DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains chemicals known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB532

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

98 — Section 1 — Product Identification

Material Safety Data Sheet

The Sherwin-Williams Co.
101 Prospect Ave. N.W.
Cleveland, OH 44115

Emergency telephone number (216) 566-2917
Information telephone number (216) 566-2902
Date of preparation March 12, 1998

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LS/1

Latex Special Purpose Finishes

— Section 2 — CAS No. Hazardous Ingredients (percent by weight)	ACGIH TLV <STEL>	OSHA PEL <STEL>	Units	Vapor Pressure (mm Hg)	Acrylic Latex Floor Enamel	PROMAR® Ext. Latex Barn Paint	Vapor Barrier	Glazing Liquid
					A24 A 10 Light Gray; A24 R 14 Tile Red; A24 A 11 Medium Gray; A24 W 15 White; A24 G 12 Evergreen	B42 RA 12 Red; B42 WA 12 White	154-6407 Vapor Barrier	A46 T 6 Glazing Liquid
112-34-5 § 2-(2-Butoxyethoxy)-ethanol	Not Established			0.1	3			
107-21-1 § Ethylene Glycol.	C 50	50	PPM	0.1	2 - 3		1	5
14464-46-1 Cristobalite	0.05	0.05	Mg/M3	as Resp. Dust	0.1 - 0.2	1		0.2
1332-58-7 Kaolin	2	5	Mg/M3	as Resp. Dust		3 - 6		
12001-26-2 Mica	3	3	Mg/M3	as Resp. Dust			5	
471-34-1 Calcium Carbonate.	10	15[5]	Mg/M3 [Resp.	as Dust Fraction]	2 - 3		10	6
13463-67-7 Titanium Dioxide.	10	10[5]	Mg/M3 [Resp.	as Dust Fraction]	0 - 12	15 In White only	4	
1314-13-2 Zinc Oxide	10	10[5]	Mg/M3 [Resp.	as Dust Fraction]		1 In White only		
1333-86-4 Carbon Black.	3.5	3.5	Mg/M3		0 - 0.2			
§ Zinc Compound. [% Zinc]						1 [1.2] in White only		
Weight per Gallon (lbs.)					9.0 - 9.8	9.3 - 10.1	10.0	8.9
Percent Water					51.2 - 61.6	54.7 - 59.5	50.2	63.8
VOC (Volatile Organic Compounds) Total - lbs./gal.					0.5 - 0.6	0.4	0.3	0.7
VOC Less Water & Federally Exempt Solvents - lbs./gal.					1.3 - 1.5	1.3	0.8	2.1
Photochemically Reactive					No	No	No	No
Flash Point (°F)					None	None	None	None
HMIS (NFPA) Rating (health - flammability - reactivity)					2* - 0 - 0	1* - 0 - 0	2 - 0 - 0	2* - 0 - 0

PERCENT BY WEIGHT

§ Ingredient subject to the reporting requirements of the Superfund Amendments and Reauthorization Act (SARA) Section 313, 40 CFR 372.65 C

→→→ *MSDS Text Page Follows* →→→

Section 3 — Physical Data

PRODUCT WEIGHT	See TABLE	*EVAPORATION RATE*	Slower than Ether
SPECIFIC GRAVITY	1.02-1.35	*VAPOR DENSITY*	Heavier than Air
BOILING RANGE	212-477 °F	*MELTING POINT*	N.A.
VOLATILE VOLUME	44-85 %	*SOLUBILITY IN WATER*	N.A.
pH	9.0-9.5 %		

Section 4 — Fire And Explosion Hazard Data

FLAMMABILITY CLASSIFICATION *FLASH POINT* See TABLE *LEL* N.Ap. *UEL* N.Ap.
Not Applicable
EXTINGUISHING MEDIA
Carbon Dioxide, Dry Chemical, Alcohol Foam
UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat.
SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

Section 5 — Health Hazard Data

ROUTES OF EXPOSURE
Exposure may be by INHALATION and/or SKIN or EYE contact, depending on conditions of use. To minimize exposure, follow recommendations for proper use, ventilation, and personal protective equipment.
ACUTE Health Hazards
EFFECTS OF OVEREXPOSURE
Irritation of eyes, skin and upper respiratory system. In a confined area vapors in high concentration may cause headache, nausea or dizziness.
SIGNS AND SYMPTOMS OF OVEREXPOSURE
Redness and itching or burning sensation may indicate eye or excessive skin exposure.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
None generally recognized.
EMERGENCY AND FIRST AID PROCEDURES
If INHALED: If affected, remove from exposure. Restore breathing. Keep warm and quiet.
If on SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.
If in EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.
If SWALLOWED: Get medical attention.
CHRONIC Health Hazards
Carbon Black is classified by IARC as possibly carcinogenic to humans (group 2B) based on experimental animal data, however, there is insufficient evidence in humans for its carcinogenicity.
Crystalline Silica (Quartz, Cristobalite) is listed by IARC and NTP. Long term exposure to high levels of silica dust, which can occur only when sanding or abrading the dry film, may cause lung damage (silicosis) and possibly cancer.
Ethylene Glycol is considered an animal teratogen. It has been shown to cause birth defects in rats and mice at high doses when given in drinking water or by gavage. There is no evidence to indicate it causes birth defects in humans.
Prolonged overexposure to solvent ingredients in Section 2 may cause adverse effects to the liver and urinary systems.
Rats exposed to titanium dioxide dust at 250 mg./m3 developed lung cancer, however, such exposure levels are not attainable in the workplace.

Section 6 — Reactivity Data

STABILITY – Stable
CONDITIONS TO AVOID
None known.
INCOMPATIBILITY
None known.
HAZARDOUS DECOMPOSITION PRODUCTS
By fire: Carbon Dioxide, Carbon Monoxide
HAZARDOUS POLYMERIZATION – Will Not Occur

Section 7 — Spill Or Leak Procedures

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove all sources of ignition. Ventilate and remove with inert absorbent.
WASTE DISPOSAL METHOD
Waste from these products is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.
Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State, and Local regulations regarding pollution.

Section 8 — Protection Information

PRECAUTIONS TO BE TAKEN IN USE
Use only with adequate ventilation. Avoid breathing vapor and spray mist. Avoid contact with skin and eyes. Wash hands after using.
These coatings may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg./m3 (total dust), 3 mg./m3 (respirable fraction), OSHA PEL 15 mg./m3 (total dust), 5 mg./m3 (respirable fraction).
VENTILATION
Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.
RESPIRATORY PROTECTION
If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.
When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.
PROTECTIVE GLOVES
Wear gloves which are recommended by glove supplier for protection against materials in Section 2.
EYE PROTECTION
Wear safety spectacles with unperforated sideshields.

Section 9 — Precautions

DOL STORAGE CATEGORY – Not Applicable
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

Section 10 — Other Regulatory Information

CALIFORNIA PROPOSITION 65
WARNING: 154-6407, A24A10, A24A11, A24G12, A24W15, A24W100 and A24W200 contain a chemical known to the State of California to cause cancer. A5W101, A5W102, A5W103, A24R14, A24W300, A24W301, A46T6, B25W35, B42RA12 and B42WA12 contain chemicals known to the State of California to cause cancer.

TSCA CERTIFICATION
All chemicals in these products are listed, or are exempt from listing, on the TSCA Inventory.

This Material Safety Data Sheet conforms to the Hazard Communication standard, 29 CFR 1910.1200(g)(4), for similar complex mixtures.
The above information pertains to these products as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to these products may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

ATTACHMENT 5 page 1

MATERIAL SAFETY DATA SHEET

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : PSX 700 ANSI #70 GRAY RESIN
IDENTIFICATION NUMBER: 700B20072
PRODUCT CLASS : ENGINEERED SILOXANE; PATENTS -5,618,860 & 5,275,645
HEALTH : WARNING HMIS/NFPA : H2F1R0

Ameron International
Protective Coatings Group
201 North Berry St.
Brea, CA 92821

EMERGENCY:800-424-9300 (ChemTrec)
24 Hours Emergency Hotline

INFORMATION: H. Kline, PHONE: 714-529-1951 PREPARE DATE: 10/12/99
PREVIOUS REVISION DATE: 01/15/99

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

ITEM	CHEMICAL NAME	CAS NUMBER	WT/WT % LESS THAN
01	PROPRIETARY (Methanol, hydrolysis generated, 250 ppm ceiling)	PROPRIETARY	40.0 %
02	PROPRIETARY (Epch**# <10ppm, DGE 130ppm, trace phenyl glycidyl ether**)	PROPRIETARY	35.0 %
03	+ TITANIUM DIOXIDE (As TI, trace impurities, <6% aluminum hydroxide, <10% amorphous silica)	13463-67-7	20.0 %
04	CALCIUM SILICATE	13983-17-0	10.0 %
05	SILICA (AMORPHOUS) (CAS # also 7631-86-9)	112926-00-8	5.0 %

(Continued on Page 2)

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

ITEM	EXPOSURE LIMITS ACGIH TLV-TWA ppm	ACGIH TLV-TWA Mg/M3	OSHA PEL-TWA ppm	OSHA PEL-TWA Mg/M3	VP mmHg @68F	TOXICITY LD50 g/kg	TOXICITY LC50 ppm

01	dna	dna	dna	dna	N.A.	dna	dna
02	dna	dna	dna	dna	N.A.	2.000	dna
03	dna	5.00	dna	5.000	N.A.	10.000	6820.000
04	dna	5.00	dna	5.000	N.A.	dna	dna
05	dna	3.0	dna	5.0	N.A.	dna	dna

REGULATORY: **CALIF.TITLE 26:22-12000 (PROP 65). WARNING: This product contains a chemical known to the State of California to cause cancer. #CALIF.TITLE 26:22-12000 (PROP 65). WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. All ingredients are on TSCA inventory or are exempt. Toxic chemicals marked (SARA, CERCLA, HAPs) are subject to reporting requirements of SARA (40CFR 355 and 372), CERCLA (40CFR 302), or HAPs (40CFR 63).

(S)=Skin; LD50=Dermal.rabbit; LC50=Inhalation,rat; dna=data not available; na=not applicable

SECTION 3 - HAZARDS IDENTIFICATION

EXPOSURE EFFECTS: Vapor or spray mist or spattered material can be harmful. Irritating to eyes, skin, and if inhaled; to nose and throat. Excessive or prolonged inhalation can cause headache, nausea or dizziness. Repeated and prolonged occupational overexposure to solvents is associated with permanent brain and nervous system damage. Intentional abuse, misuse or other massive exposure to solvents may cause multiple organ damage and/or death.

OVER-EXPOSURE (prolonged or repeated use): CAN AGGRAVATE OR ACCENTUATE ANY OF THESE EFFECTS.

SKIN: Irritant. Sensitization or allergic reaction, such as rash or hives.

INHALATION: Irritant. Lung injury. Respiratory sensitization and allergic reaction such as asthma.

EYES: Irritant.

INGESTION: Harmful if swallowed.

TARGET ORGANS: Lungs. Skin. Eyes. Stomach.

MEDICAL CONDITIONS AGGRAVATED: Skin. Eyes. Respiratory.

(Continued on Page 3)

SECTION 3 - HAZARDS IDENTIFICATION

PRIMARY ROUTE(S) OF ENTRY: SKIN CONTACT INHALATION INGESTION EYE CONTACT

SECTION 4 - FIRST AID MEASURES

FIRST AID PROCEDURES: Inhalation: Remove to fresh air. Restore normal breathing. Treat symptomatically. See physician. SKIN: Wash thoroughly with soap and water.Remove contaminated clothing.Consult physician if irritation persists. EYES: Flush immediately with plenty of water for at least 15 minutes and get medical attention. INGESTION: Drink 1 or 2 glasses of water to dilute.Never give anything by mouth to an unconscious person.Do not induce vomiting(unless METHANOL; listed in Section 2). Consult physician or poison control center IMMEDIATELY. Treat symptomatically.

SECTION 5 - FIRE FIGHTING MEASURES

FLASH POINT: 207 F (SETA)

LOWER EXPLOSIVE LIMIT: N.A.
UPPER EXPLOSIVE LIMIT: N.A.

FLAMMABILITY - OSHA: COMBUSTIBLE - CLASS IIIB
DOT: NOT REGULATED

EXTINGUISHING MEDIA: FOAM CO2 DRY CHEMICAL

LOWEST FLASHING SOLVENT:

UNUSUAL FIRE AND EXPLOSION HAZARDS: Closed containers may explode when exposed to extreme heat and pressure buildup. May produce a floating fire hazard. Isolate from electrical equipment, sparks, heat and open flame. Vapors may spread long distances, cause flash fire or ignite explosively.

FIREFIGHTING PROCEDURES: Wear full protective equipment, self-contained breathing apparatus. Water may be used to cool closed containers to prevent pressure build-up or explosion when exposed to extreme heat.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

SPILL, LEAKS: Remove all sources of ignition. Avoid breathing vapors. Ventilate area. Use absorbent, inert cleanup materials. (DO NOT use sawdust.) Remove absorbent material with non-sparking tools. Place in separate container. Keep out of sewers and waterways. If entry is threatened or occurs, notify local authorities.

(Continued on Page 4)

SECTION 7 - HANDLING AND STORAGE

HANDLING AND STORAGE: Keep container closed, upright when not in use. Store in cool, dry, well-ventilated area. Avoid prolonged storage temperatures above 100F. Use caution when pouring. Avoid breathing sanding dust. Do not weld or flame cut on empty container.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

VENTILATION: Implement administrative and engineering controls to reduce exposure. Provide sufficient ventilation in volume and pattern to keep air contaminant concentrations below the TLV limits. Remove welding or flame cutting decomposition products; follow current,ANSI Z49.1,"Safety in Welding and Cutting". Refer to 29 CFR parts 1910 and 1915, for coating operations; part 1910.146, Confined Spaces.

RESPIRATORY PROTECTION: Wear NIOSH/MSHA certified respirator designed to remove a combination of particulates (dust or spray mist) and vapor. When brushing, rolling or spreading; select the appropriate respiratory protection for the conditions. For specific conditions, refer to current "NIOSH Pocket Guide to Chemical Hazards". In confined or restricted ventilation areas use air-line respirators or hoods. Refer to 29 CFR, OSHA parts 1910.134 and 1915 for coating operations;part 1910.146 Confined Spaces;ANSI Z88.2,Practices for Respiratory Protection; 42 CFR, part 84 Particulate Respirators.

PROTECTIVE CLOTHING AND EQUIPMENT: Dependent upon application method, wear resistant coveralls, gloves and shoe coverings to prevent skin contact. Wear solvent resistant glasses with splash guards or face shield to protect eyes from splash, spatter and/or spray mist.Consult 29 CFR 1910.132, 133, 136, 138; ANSI Z87.1, Z41. Use explosion and spark-proof equipment.

HYGIENIC PRACTICES: Wash thoroughly after handling and before eating, smoking or using toilet. Launder contaminated clothing before use. Destroy contaminated leather and absorbent shoes which cannot be decontaminated.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

BOILING RANGE	: 212 - 212 F	VAPOR DENSITY	: Is heavier than air
ODOR	: NA	WEIGHT PER GAL	: 11.4290
APPEARANCE	: LIQUID	EVAPORATION RATE	: Is slower than Butyl Acetate
SOLUBILITY IN H2O	: NO		
EPA MIXED VOC, G/L	: 120	EPA MIXED THIN VOC, G/L	: 204
THINNER	: 900 @ 1 pint	PHOTOCHEMICALLY REACTIVE	: No
VOLATILE VOLUME %	: 0.28		

(Continued on Page 5)

SECTION 10 - STABILITY AND REACTIVITY

CONDITIONS TO AVOID: Heat, open flame, arc or sparks. Water or moisture.

INCOMPATIBILITY: Strong oxidizers, acids and alkalies.

HAZARDOUS DECOMPOSITION PRODUCTS: +Pigment content is dependent on color. (BY FIRE, BURNING OR WELDING); CO, CO2. Aldehydes. Silicon oxide fumes. Methanol. Formaldehyde at temperatures above 300F (150C).

HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.

STABILITY: This product is stable under normal storage conditions.

SECTION 11 - TOXICOLOGICAL PROPERTIES

TOXICOLOGICAL PROPERTIES: See Section 2.

SECTION 12 - ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION: No Information.

SECTION 13 - DISPOSAL CONSIDERATIONS

EPA Waste No.: None

DISPOSAL METHOD: Place in separate, appropriate, closed container in accordance with all applicable local, State, and Federal regulations. This material has NOT been tested by Toxicity Characteristic Leaching Procedure (TCLP).

SECTION 14 - TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME: Paint

DOT HAZARD CLASS: NA HAZARD SUBCLASS: NA

DOT UN/NA NUMBER: Not Regulated IMO: NA PACKING GROUP : NA

SECTION 15 - REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS: AS FOLLOWS -

(Continued on Page 6)

SECTION 15 - REGULATORY INFORMATION

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200)

NEW JERSEY RIGHT-TO-KNOW:
The following materials are non-hazardous, but are among the top five components in this product:

---------- CHEMICAL NAME ---------- CAS NUMBER
No non-hazardous materials are among the top five ingredients.

PENNSYLVANIA RIGHT-TO-KNOW:
The following non-hazardous ingredients are present in the product at greater than 3%:

---------- CHEMICAL NAME ---------- CAS NUMBER
No non-hazardous ingredients are present at greater than 3%.

INTERNATIONAL REGULATIONS: AS FOLLOWS -

CANADIAN WHMIS: This MSDS has been prepared in compliance with Controlled Product Regulations except for use of the 16 headings.

CANADIAN WHMIS CLASS: No information available.

SECTION 16 - OTHER INFORMATION

DATE PRINTED: 10/12/99

Bayer

MATERIAL SAFETY DATA SHEET

BAYER CORPORATION
PRODUCT SAFETY & REGULATORY AFFAIRS
100 Bayer Road
Pittsburgh, PA 15205-9741

TRANSPORTATION EMERGENCY
CALL CHEMTREC: (800) 424-9300
DISTRICT OF COLUMBIA: (202) 483-7616

NON-TRANSPORTATION
BAYER EMERGENCY PHONE...: (412) 923-1800
BAYER INFORMATION PHONE..: (800) 662-2927

I. PRODUCT IDENTIFICATION:

PRODUCT NAME.....: Desmodur N-3300 Unstabilized
PRODUCT CODE.....: DA-81
CHEMICAL FAMILY.....: Aliphatic Polyisocyanate
CHEMICAL NAME.....: 1,6-Hexamethylene Diisocyanate Based Polyisocyanate
SYNONYMS.....: Polymeric Hexamethylene Diisocyanate
FORMULA.....: Not Applicable

II. HAZARDOUS INGREDIENTS:

INGREDIENT NAME /CAS NUMBER	EXPOSURE LIMITS	CONCENTRATION (%)
Homopolymer of HDI 28182-81-2	OSHA : Not Established ACGIH: Not Established The recommended Manufacturer Guideline Level (MGL) for HDI based Polyisocyanates is: 0.5 mg/m3 (TWA - averaged over 8 hours) and 1.0 mg/m3 Short Term Exposure (STEL - averaged over 15 minutes)	Essentially 100 %
Hexamethylene Diisocyanate (HDI) 822-06-0	OSHA : Not Established ACGIH: .005 ppm TWA Monomer content is less than 0.2% based on resin solids at the time of manufacturer. Bayer also recommends a ceiling level of 0.02 ppm (Manufacturer Guideline Level (MGL)).	* %

III. PHYSICAL PROPERTIES:

PHYSICAL FORM.....: Liquid
COLOR.....: Clear/Pale Yellow
ODOR.....: Slight
MOLECULAR WEIGHT.....: Approx. 500 (polyisocyanate)
BOILING POINT.....: Approx. 446 F (230 C)

Continued on next page

11700

III. PHYSICAL PROPERTIES (Continued)

MELTING/FREEZING POINT....: Not established
SOLUBILITY IN WATER .....: Resin is insoluble - reacts slowly with water to liberate CO2 gas.
SPECIFIC GRAVITY .....: 1.17 @ 68 F (20 C)
BULK DENSITY.....: 9.76 lbs/gal
% VOLATILE BY WEIGHT.....: Negligible
VAPOR PRESSURE .....: Polyisocyanate: Approx. 7.5 x 10-5 mm Hg @ 20 C

IV. FIRE AND EXPLOSION DATA:

FLASH POINT.....: 460.0 F (237.7 C) Setaflash (ASTM D-3243, D-3278, D-3828)
AUTO-IGNITION TEMPERATURE.....: 860 F (460 C) DIN 71794
EXTINGUISHING MEDIA.....: Dry Chemical; Carbon Dioxide; Foam; Water spray for large fires.
SPECIAL FIRE FIGHTING PROCEDURES: Full emergency equipment with self-contained breathing apparatus and full protective clothing should be worn by firefighters. During a fire, HDI vapors and other irritating, highly toxic gases may be generated by thermal decomposition or combustion (See Section VIII.) Closed container may explode when exposed to extreme heat or burst when contaminated with water (CO2 evolved).

V. HUMAN HEALTH DATA:

ROUTE(S) OF ENTRY.....: Inhalation; Skin Contact; Eye Contact.

HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE:
ACUTE INHALATION.....: HDI vapors or mist at concentrations above the TLV or MGL can irritate (burning sensation) the mucous membranes in the respiratory tract (nose, throat, lungs) causing runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function (breathing obstruction.). Persons with a preexisting, nonspecific bronchial hyperreactivity can respond to concentrations below the TLV or MGL with similar symptoms as well as an asthma attack. Exposure well above the TLV or MGL may lead to bronchitis, bronchial spasm and pulmonary edema (fluid in lungs). These effects are usually reversible. Chemical or hypersensitive pneumonitis, with flu-like symptoms (e.g., fever, chills) has also been reported.
CHRONIC INHALATION.....: As a result of previous repeated overexposures or a single large dose, certain individuals will develop isocyanate sensitization (chemical asthma) which will cause them to react to a later exposure to isocyanate at levels well below the TLV or MGL. These symptoms, which include: chest tightness, wheezing, cough, shortness of breath or asthmatic attack, could be immediate or delayed up to several hours after exposure. Similar to many non-specific asthmatic responses,

V. HUMAN HEALTH DATA (Continued)

there are reports that once sensitized an individual can experience these symptoms upon exposure to dust, cold air or other irritants. This increased lung sensitivity can persist for weeks and in severe cases for several years. Chronic overexposure to isocyanates has also been reported to cause lung damage, including decrease in lung function, which may be permanent. Sensitization may be either temporary or permanent.

ACUTE SKIN CONTACT.....: Isocyanates react with skin protein and moisture and can cause irritation. Symptoms of skin irritation may be reddening, swelling, rash, scaling or blistering. Some persons may develop skin sensitization from skin contact. Cured material is difficult to remove.

CHRONIC SKIN CONTACT.....: Prolonged contact with the isocyanate can cause reddening, swelling, rash, scaling or blistering. In those who have developed a skin sensitization, these symptoms can develop as a result of contact with very small amounts of liquid material or even as a result of vapor-only exposure.

ACUTE EYE CONTACT.....: Liquid, aerosols and vapors of this product are irritating and can cause pain, tearing, reddening and swelling accompanied by a stinging sensation and/or a feeling like that of fine dust in the eyes.

CHRONIC EYE CONTACT.....: May result in corneal opacity (clouding of the eye surface).

ACUTE INGESTION.....: Can result in irritation and possible corrosive action in the mouth, stomach tissue and digestive tract.

CHRONIC INGESTION.....: None Found

CARCINOGENICITY
- NTP.....: Not listed
- IARC.....: Not listed
- OSHA.....: Not regulated

MEDICAL CONDITIONS
- AGGRAVATED BY EXPOSURE.....: Asthma and other respiratory disorders (bronchitis, emphysema, hyperreactivity), skin allergies, eczema.

EXPOSURE LIMITS.....: Not established for product as a whole. Refer to Section II for exposure limits of hazardous constituents. The Manufacturer Guideline Level of 0.5 mg/m3 - TWA and 1.0 mg/m3 - STEL for the Homopolymer of HDI and 0.02 ppm ceiling for HDI monomer are internal guides based on limited data; they are provided as guides pending the review of future data.

VI. EMERGENCY AND FIRST AID PROCEDURES:

FIRST AID FOR EYES.....: Flush with clean, lukewarm water (low pressure) for at least 15 minutes, while lifting eyelids. Refer individual to physician or ophthalmologist for immediate follow-up.

VI. FIRST AID PROCEDURES (Continued)

FIRST AID FOR SKIN.....: Remove contaminated clothing immediately. Wash affected areas thoroughly with soap and water. Wash contaminated clothing thoroughly before reuse. For severe exposures, get under safety shower after removing clothing, then get medical attention. For lesser exposures, seek medical attention if irritation develops or persists.

FIRST AID FOR INHALATION: Move to an area free from risk of further exposure. Administer oxygen or artificial respiration as needed. Obtain medical attention. Asthmatic-type symptoms may develop and may be immediate or delayed up to several hours. Treatment is essentially symptomatic. Consult physician.

FIRST AID FOR INGESTION.: DO NOT INDUCE VOMITING. Give 1 to 2 cups of milk or water to drink. DO NOT GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSING PERSON. Consult physician.

NOTE TO PHYSICIAN.....: Eyes: Stain for evidence of corneal injury. If cornea is burned, instill antibiotic/steroid preparation frequently. Workplace vapors could produce reversible corneal epithelial edema impairing vision. Skin: This product is a known skin sensitizer. Treat symptomatically as for contact dermatitis or thermal burn. Ingestion: Treat symptomatically. There is no specific antidote. Inducing vomiting is contraindicated because of the irritating nature of the product. Inhalation: This product is a known pulmonary sensitizer. Treatment is essentially symptomatic. An individual having a dermal or pulmonary sensitization reaction to this material must be removed from any further exposure to any isocyanate.

VII. EMPLOYEE PROTECTION RECOMMENDATIONS:

REQUIRED WORK/HYGIENE PROCEDURES...: Precautions must be taken so that persons handling this product do not allow contact with the eyes or skin. In spray operations, protection must be afforded against exposure to both vapor and spray mist.

SKIN PROTECTION REQUIREMENTS.....: Permeation resistant gloves. Cover as much of the exposed skin area as possible with appropriate clothing. If skin creams are used, keep the area protected only by the cream to a minimum.

RESPIRATOR REQUIREMENTS.....: A respirator that is recommended or approved for use in isocyanate containing environments (air purifying or fresh air supplied) may be necessary for spray applications or other situations such as high temperature use which may produce inhalation exposures. A supplied air respirator (either positive pressure or continuous flow type) is recommended. Before an air-purifying respirator can be used, air monitoring must be performed to measure airborne concentrations of HDI monomer, HDI polyisocyanate and organic solvent(s). See the outline below for the specific conditions under which air-purifying respirators can be used. Observe OSHA regulations for respirator use (29 CFR 1910.134).

SPRAY APPLICATION:

A. Good industrial hygiene practice dictates that when isocyanate based

Continued on next page

VII. EMPLOYEE PROTECTION (Continued)

coatings are spray applied, some form of respiratory protection should be worn. During the spray application of organic solvent containing coatings systems, the use of a supplied-air (either positive pressure or continuous flow type) respirator is mandatory when ONE OR MORE of the following conditions exists:
- the airborne isocyanate concentrations are not known; or
- the airborne isocyanate monomer concentrations exceed 0.05 ppm (10 times the TLV); or
-the airborne polyisocyanate (polymeric, oligomeric) concentrations exceed 5 mg/m3 averaged over 8 hours or 10 mg/m3 averaged over 15 minutes (10 times the MGL); or
- no airborne solvent concentration exceeds its odor threshold; or
- spraying is performed in a confined space (See OSHA Confined Space Standard 29 CFR 1910.146).
A properly fitted air-purifying (combination organic vapor and particulate) respirator, proven by test to be effective in isocyanate-containing spray paint environments, and used in accordance with all recommendations made by the manufacturer, can be used when ALL of the following conditions are met:
- the airborne isocyanate monomer concentrations are known to be below 0.05 ppm (10 times the TLV); and
- the airborne polyisocyanate (polymeric, oligomeric) concentrations are known to be below 5 mg/m3 averaged over 8 hours or 10 mg/m3 averaged over 15 minutes (10 times the MGL); and
- at least one solvent has a published odor threshold*; and
- at least one airborne solvent concentration exceeds its odor threshold and that solvent's odor threshold is lower than its TLV
B. During the spray application of a coatings system NOT containing organic solvents a supplied-air (either positive pressure or continuous flow type) respirator is mandatory when ONE OR MORE of the following conditions exists:
- the airborne isocyanate concentrations are not known; or
- the airborne isocyanate monomer concentration exceeds the TLV of 0.005 ppm; or
- the airborne polyisocyanate (polymeric, oligomeric) concentration exceeds the MGL of 0.5 mg/m3 averaged over 8 hours or 1 mg/m3 averaged over 15 minutes; or
- spraying is performed in a confined space (See OSHA Confined Space Standard 29 CFR 1910.146.)
Under any other circumstances, during spray application of a coatings system NOT containing organic solvents, good industrial hygiene practice dictates that when isocyanate based coatings are spray applied at least an air-purifying respirator should be worn.
NON-SPRAY OPERATIONS:
A. During non-spray operations such as mixing, batch making, brush or roller application, etc., at elevated temperatures (for example, heating of material or application to a hot substrate), it is possible to be exposed to airborne isocyanate vapors. Therefore, when the coatings system contains solvents and will be applied in a non-spray manner, a supplied-air (either positive pressure or continuous flow type) respirator is mandatory when ONE OR MORE of the following conditions exists:
- the airborne isocyanate concentrations are not known; or

VII. EMPLOYEE PROTECTION (Continued)

- the airborne isocyanate monomer concentrations exceed 0.05 ppm (10 times the TLV); or
-the polyisocyanate (polymeric, oligomeric) concentrations exceed 5 mg/m3 averaged over 8 hours or 10 mg/m3 averaged over 15 minutes (10 times the MGL); or
- no airborne solvent concentration exceeds its odor threshold; or
-operations are performed in a confined space (See OSHA Confined Space Standard 49 CFR 1910.146).

A properly fitted air purifying (combination organic vapor and particulate) respirator, proven by test to be effective in isocyanate-containing paint environments, and used in accordance with all recommendations made by the manufacturer, can be used when ALL of the following conditions are met:
- the airborne concentrations of the isocyanate monomer are below 0.05 ppm (10 times the TLV); and
- the airborne polyisocyanate (polymeric, oligomeric) concentrations are known to be below 5 mg/m3 averated over 8 hours or 10 mg/m3 averaged over 15 minutes (10 times the MGL); and
-at least one solvent has a published odor threshold*; and
-at least one airborne solvent concentration exceeds its odor threshold and that solvent's odor threshold is lower than its TLV.

B. During non-spray operations using a solvent-free coatings system, a supplied-air (either positive pressure or continuous flow type) respirator is mandatory when ONE OR MORE of the following conditions exixts:
- the airborne isocyanate concentrations are not known; or
- the airborne isocyanate monomer concentrations exceed the TLV of 0.005 ppm; or
- the airborne polyioscyante (polymeric, oligomeric) concentrations exceed the MGL of 0.5 mg/m3 averaged over 8 hours, or 1.0 mg/m3 averaged over 15 minutes; or
- operations are performed in a confined space (See OSHA Confined Space Standard 49 CFR 1910.146).

VENTILATION REQUIREMENTS.....: Good industrial hygiene practice dictates that worker protection should be achieved through engineering controls such as ventilation whenever feasible. When such controls are not feasible to achieve full protection, the use of respirators and other personal protective equipment is mandated.(SEE RESPIRATOR REQUIREMENTS) Exhaust air may need to be cleaned by scrubbers or filters to reduce environmental contamination. Curing ovens must be ventilated to prevent emissions into the workplace. If oven off-gases are not vented properly (i.e. they are released into the work area), it is possible to be exposed to airborne monomeric HDI.

MONITORING.....: Refer to Patty's Industrial Hygiene and Toxicology-Volume 1 (3rd edition) Chapter 17 and volume III (1st edition) Chapter 3-for guidance concerning appropriate air sampling strategy to determine airborne concentrations of isocyanates and solvent.

MEDICAL SURVEILLANCE.....: Medical supervision of all employees who handle or come in contact with this product is recommended. This should include preemployment and periodic medical examinations with respiratory function tests (FEV, FVC as a minimum). Persons with asthma-type conditions, chronic bronchitis, other chronic respiratory deseases or recurrent skin eczema or sensitization should be excluded from working with

VII. EMPLOYEE PROTECTION (Continued)

isocyanates. Once a person is diagnosed as sensitized to an isocyanate, no further exposure can be permitted.

ADDITIONAL PROTECTIVE MEASURES.....: Safety showers and eyewash stations should be available. Educate and train employees in safe use of product. Follow all label instructions. For additional information, see Bayer's "Health and Safety Information for Hexamethylene Diisocyanate Based Polyisocyanates".

* We recommend using the Geometric Mean Air Odor Threshold found in Table 5.1 of "Odor Thresholds for Chemicals with Established Occupational Health Standards," - AIHA

VIII. REACTIVITY DATA:

STABILITY.....: This is a stable material.

HAZARDOUS POLYMERIZATION...: May occur; Contact with moisture or other materials which react with isocyanates or temperatures over 400 F (204 C) may cause polymerization.

INCOMPATIBILITIES.....: Water, amines, strong bases, alcohols, metal compounds and surface active materials.

INSTABILITY CONDITIONS.....: None known.

DECOMPOSITION PRODUCTS.....: By high heat and fire: carbon dioxide, carbon monoxide, oxides of nitrogen, HCN, HDI.

IX. SPILL AND LEAK PROCEDURES:

SPILL OR LEAK PROCEDURES....: Evacuate nonessential personnel. Remove all sources of ignition and ventilate the area. Notify appropriate authorities if necessary. Put on personal protective equipment (see Section VII). Dike or impound spilled material and control further spillage if feasible. Cover the spill with sawdust, vermiculite, Fuller's earth or other absorbent material. Pour decontamination solution over spill area and allow to react for at least 10 minutes. Collect material in open containers and add further amounts of decontamination solution. Remove containers to a safe place, cover loosely, and allow to stand for 24 to 48 hours. Wash down spill area with decontamination solutions. Decontamination solutions: nonionic surfactant Union Carbide's Tergitol TMN-10 (20%) and water (80%); concentrated ammonia (3-8%), detergent (2%) and water (90-95%).

WASTE DISPOSAL METHOD.....: Waste must be disposed of in accordance with federal, state and local environmental control regulations. Incineration is the preferred method. Empty containers must be handled with care due to product residue. Decontaminate containers prior to disposal. DO NOT HEAT OR CUT EMPTY CONTAINER WITH ELECTRIC OR GAS TORCH. (See Section IV and VIII).

X. SPECIAL PRECAUTIONS & STORAGE DATA:

STORAGE TEMPERATURE(MIN/MAX): -30 F (-34 C)/122 F (50 C)
SHELF LIFE.....: 6 months @ 77 F (25 C) after receipt of material by customer.
SPECIAL SENSITIVITY.....: If container is exposed to high heat, it can be pressurized and possibly rupture explosively. HDI reacts slowly with water to form CO2 gas. This gas can cause sealed containers to expand and possibly rupture explosively.
HANDLING/STORAGE PRECAUTIONS: Store in tightly closed containers to prevent moisture contamination. Do not reseal if contamination is suspected. At maximum storage temperatures noted, material may slowly polymerize without hazard. Ideal storage temperature range for ease of handling is 50-81 F (10-27 C). Avoid contact with skin and eyes. Employee education and training in the safe use and handling of this product are required under the OSHA Hazard Communication Standard.

XI. SHIPPING INFORMATION:

D.O.T. SHIPPING NAME.....: None
TECHNICAL SHIPPING NAME.....: Polyisocyanate
D.O.T. HAZARD CLASS.....: Non-Regulated
U.N./N.A. NUMBER.....: None
PRODUCT RQ (lbs.) .....: None
D.O.T. LABEL.....: Non-regulated
D.O.T. PLACARD.....: Non-regulated
FREIGHT CLASS BULK.....: Isocyanate
FREIGHT CLASS PACKAGE.....: Chemicals, NOI (Isocyanate), NMFC 60000
PRODUCT LABEL .....: Desmodur N-3300 Unstabilized

XII. ANIMAL TOXICITY DATA:

TOXICITY DATA FOR: HDI homopolymer materials except where indicated.
ACUTE TOXICITY
ORAL LD50.....: Estimated to be greater than 10000 mg/kg (rats). (Based on the results of actual tests conducted using specific HDI-homopolymer products.)
DERMAL LD50.....: Estimated to be greater than 5000 mg/kg (rabbits). (Based on the results of actual tests conducted using specific HDI-homopolymer products.)
INHALATION LC50....: Lower respiratory (pulmonary) irritant. LC50 values range from 137-1150 mg/m3 were obtained in rats exposed to aerosols. (4H

Continued on next page

XII. ANIMAL TOXICITY DATA (Continued)

exp.)
EYE EFFECTS.....: Severe irritant capable of inducing corneal injury (Rabbit); maximum primary eye irritation score: 54.6/110 for a 24 hr. exposure.
SKIN EFFECTS.....: Moderate irritant; primary dermal irritation score: 3.4/8.0 (rabbit)
SENSITIZATION.....: Pulmonary and dermal sensitizer in humans. Delayed dermal sensitization was observed in guinea pigs. However, the respiratory sensitization potential of Desmodur N-3300 assessed in guinea pigs was negative. Evidence exists that cross-sensitization between HDI and other isocyanates, particularly hydrogenated MDI and TDI, can occur.
OTHER ACUTE EFFECTS: AMES TEST: Negative for Desmodur N-100 (100% solids material).

SUBCHRONIC TOXICITY...: Rats exposed to a HDI homopolymer (isocyanurate type, specifically, the solvent-free Desmodur N-3300), at 4.3, 14.7 and 89.8 mg/m3 for three weeks (6 hrs/day, 5 days/wk) exhibited respiratory distress and inflammation of the nasal passages at 14.7 mg/m3 and above. At the 89.8 mg/m3 level, inflammatory lesions at many sites of the lungs were also observed. The No Observable Effect Level (NOEL) was 4.3 mg/m3. Rats were also exposed to an HDI homopolymer (isocyanurate type, specifically, the solvent-free product Desmodur N-3300), for 13 weeks (6 hrs/day, 5 days/wk) at aerosol concentrations of 0.5, 3.3 and 26.4 mg/m3. Body weight gain of male rats of the 26.4 mg/m3 group were slightly reduced toward the end of the study. The lung weight to body weight ratio was significantly increased in the male and female rats of the 26.4 mg/m3 group. Histopathologic diagnosis of these animals revealed inflammatory changes and formation of fibrous tissue at the point of injury in the respiratory tract. In addition, the lung function tests at the end of the study provided evidence of a chronic obstructive lung disorder in rats of the 26.4 mg/m3 group. The No Observable Effect Level (NOEL) in this study is considered to be 3.3 mg/m3.

OTHER TOXICITY DATA...: Mice were exposed to a liquid aerosol of an HDI homopolymer (isocyanurate type, specifically, the solvent-free product Desmodur N-3300), mixed with acetone for three hours. The irritation potential expressed as the RD50 (the concentration which is predicted to reduce the respiratory rate 50%) was 20.8 mg/m3 (95% confidence interval = 18.3 to 23.9 mg/m3). Pulmonary (lung) irritation was observed first, followed by sensory (eye, nose, and throat) irritation.

XIII. FEDERAL REGULATORY INFORMATION:

OSHA STATUS.....: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.
TSCA STATUS.....: On TSCA Inventory
CERCLA REPORTABLE QUANTITY..: None

XIII. FEDERAL REGULATORY INFORMATION (Continued)

SARA TITLE III:
SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES..: None
SECTION 311/312 HAZARD CATEGORIES.....: Immediate Health Hazard; Delayed Health Hazard; Reactive Hazard
SECTION 313 TOXIC CHEMICALS.....: None
RCRA STATUS.....: If discarded in its purchased form, this product would not be a hazardous waste either by listing or by characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste. (40 CFR 261.20-24)

XIV. OTHER REGULATORY INFORMATION:

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

COMPONENT NAME /CAS NUMBER	CONCENTRATION	STATE CODE
Homopolymer of HDI 28182-81-2	Essentially 100 %	PA3, NJ4

NJ4 = New Jersey Other - included in 5 predominant ingredients > 1%
PA3 = Pennsylvania Non-hazardous present at 3% or greater.

CALIFORNIA PROPOSITION 65
To the best of our knowledge, this product contains no levels of listed substances, which the state of California has found to cause cancer, birth defects or other reproductive effects.

MASSACHUSETTS SUBSTANCE LIST (MSL)
Hazardous Substances and Extraordinarily Hazardous Substances on the MSL must be identified when present in products. To the best of our knowledge, this product contains no substances at a level which could require reporting under the statute.

HMIS RATINGS:	Health	Flammability	Reactivity
	2*	1	1

11700

XIV. OTHER REGULATORY INFORMATION (Continued)

0=Minimal 1=Slight 2=Moderate 3=Serious 4=Severe
*=Chronic Health Hazard

Bayer's method of hazard communication is comprised of Product Labels and Material Safety Data Sheets. HMIS ratings are provided by Bayer Corporation as a customer service.

XV. APPROVALS:

REASON FOR ISSUE.....: Revise Sections II, V, VII
PREPARED BY.....: B. J. Gambino
APPROVED BY.....: H. E. Myer
APPROVAL DATE.....: 06/15/95
SUPERSEDES DATE.....: 12/14/94
MSDS NUMBER.....: 07003

This information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of Bayer Corporation. The data on this sheet relates only to the specific material designated herein. Bayer Corporation assumes no legal responsibility for use or reliance upon these data.

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Finally, a way to protect costly concrete driveways and concrete floors

EZ-COAT SKID-PROOF

Product Description:

Skid-Proof EZ-Coat, brush and roll, is a waterborne, acrylic based, quartz, non-cementitious, anti-skid coating. It is environmentally safe, non-flammable, non-hazardous and contains low VOC's (Volatile Organic Compounds). Skid-Proof EZ-Coat is neutral in color allowing the availability of various decorative colors by adding your desired color of Exterior Gloss, Semi-Gloss, Satin Acrylic, Acrylic Floor Enamel or Industrial Acrylic Enamel Paint in a ratio of 1 quart to a I0 pound pail or 1 gallon to a 40 pound pail of Skid-Proof EZ-Coat. Skid-Proof EZ-Coat, when fully cured, is hard and tough; yet flexible. On horizontal surfaces it is anti-skid. On vertical surfaces (i.e. risers on stairways), Skid-Proof EZ-Coat provides a heavy duty textured coating. Skid-Proof EZ-Coat, when fully cured, is waterproof, weather-resistant, impact resistant, salts and chlorine resistant. During and after application, before it has time to dry, Skid-Proof EZ-Coat may be cleaned up with water.

Basic Use: Skid-Proof EZ-Coat is a decorative, protective anti-skid coating for long term preservation of various surfaces including: concrete, wood, plywood and primed metal. Skid-Proof EZ-Coat can be used interior and exterior on horizontal surfaces including traffic areas such as: walkways, patios, stairs, pool decks, balconies, ramps, driveways, carports, etc.

Preparation:

Remove dirt, oils, foreign matter, and previous coatings from surface to be coated. Concrete surfaces must be clean and dry before applying SKID-PROOF EZ-COAT. For best performance, smooth concrete surfaces may require acid-etching before sealing. This is done by applying a 25% diluted solution of muratic acid and water (1 part acid to 4 parts of water). After approximately five minutes, rinse completely with water. A second rinse and/or a neutralizer may be required. Always check pH of surface before coating. A pH reading of 7 - 9 is required before application. Bare metal surfaces require priming with an appropriate metal primer. To insure maximum bond for SKID-PROOF EZ-COAT, seal non-metal surfaces with SEAL-KRETE Waterproofing Sealer before application. Allow sealer to dry a minimum of 2 - 4 hours before applying SKID-PROOF EZ-COAT.

Fill all cracks using a high quality concrete patch mix. To protect areas or surfaces not to be coated from roller splatter, cover with materials such as plastic sheeting, masking tape, etc.

Application:

Add your desired color of Exterior Gloss, Semi-gloss or Satin Acrylic Latex, Acrylic Floor Enamel or Industrial Acrylic Enamel paint, in a ratio of 1 quart to a 10 pound pail or 1 gallon to a 40 pound pail, to the neutral base Skid-Proof EZ-Coat. Mix well with a mechanical mixer or on a shaker. Skid-Proof EZ-Coat will take on the same color as the paint. Skid-Proof EZ-Coat may be applied with a synthetic or **mohair roller only**. The roller must be of the type used for adhesives, epoxies, contact cements and mastics. The nap should not exceed 3/16". Skid-Proof EZ-Coat may also be applied with a brush. The brush must be a high quality polyester/nylon or nylon bristle type.

Important: Apply Skid-Proof EZ-Coat liberally - Do not try to spread out thin. Apply to achieve a uniform textured appearance.

Recommended spread rate is 15-20 mils (wet film thickness per coat).
Normally, two coats of Skid-Proof EZ-Coat will suffice. However, smooth surfaces may

require additional coats. The more porous and profiled the surface is, the better the Skid-Proof EZ-Coat "lay down" properties will be. Smooth concrete should be acid etched, and neutralized thoroughly before application.

Note: A test area should first be applied on surface to be coated for product suitability and desired appearance.

Limitations / Cautions:

Do not apply if the threat of rain is imminent or if rain is expected within 8 hours after the application of SKID-PROOF EZ-COAT

Surface, coating, and air temperature must be above 50 degrees before application. Do not apply coating if the temperature is below 50 degrees F or if it is expected to fall below 50 degrees F for the first 12 hours after application.

Do not freeze. Store at room temperature above 40 degrees F.

Do not add oil/alkyd base paint to SKID-PROOF EZ-COAT.

Do not use Interior Latex paint or Flat Exterior Latex paint.

Do not use regular "off the shelf" latex paint rollers - see application section

Do not spread SKID-PROOF EZ-COAT thin. Apply to achieve a uniformly textured appearance. Keep a "wet edge".

Coating softens when in contact with some solvents such as acetone, xylene, toluene, gasoline, and ketone, but will recover.

SKID-PROOF EZ-COAT should not be used in areas subject to hydrostatic pressure, constant standing water (such as swimming pools, ponds, water holding tanks, waste water treatment tanks, etc.), or on leaky basement walls.

Allow new concrete slabs or concrete patch areas to cure a minimum or 7 days before applying SKID-PROOF EZ-COAT.

As with any coating, SKID-PROOF EZ-COAT may become worn or damaged over time. Proper inspection and maintenance must be followed to ensure required performance of coating.

Coverage: Square foot coverage will vary depending on substrate and thickness applied. Skid-Proof EZ-Coat with paint added will cover approximately 150 square feet per 10 pound pail or 600 square feet per 40 pound pail at 20 mils (wet film thickness).

Application Tools:

Skid-Proof EZ-Coat may be applied with a synthetic or mohair roller only. The roller must be of the type used for adhesives, epoxies, contact cements and mastics. The nap should not exceed 3/16". Skid-Proof EZ-Coat may also be applied with a brush. The brush must be a high quality polyester/nylon or nylon bristle type

Maintenance:

After coating has cured, occasional cleaning is required on horizontal areas subject to traffic. For maximum cleanability, solvent, and chemical resistance, Seal-Krete Concrete Floor and Driveway Sealer is recommended as a non-buffing protective sealer finishes. They provide a clear, hard gloss, protective seal to the finished coating while still maintaining the anti-skid properties. Allow SKID-PROOF EZ-COAT to cure 12 hours minimum before applying the sealer. Two coats are recommended.

Warranty:

Manufacturer/seller makes no warranty of any kind, expressed or implied, except that this product shall be free from defects. Buyer remedies for breach of warranty are limited to replacement of the product, if it is defective, or refund of purchase price, at manufacturers/sellers option. Buyer assumes all risk and liability resulting from use of and disposal of this product. This warranty may not be altered, modified, or expanded by oral statement of any person, agent, salesman, or dealer before, during, or after the sale

Technical Services:

Technical information and any advice furnished by Seal-Krete, Inc. concerning any use or application of SKID-PROOF EZ-COAT, is as reliable as current technology allows. Seal-Krete, Inc., makes no warranty, expressed or implied, of any use or application for which such information or advice is furnished. If additional technical assistance and information is needed, it is available upon request.

Table 1

Coefficient of Friction test (anti-skid test)
(ASTM F-1677 and ASTM F 1679)

Tester	Slider pad	Surface condition	Avg. Slip resistance
XL	Neolite	Dry	.95
XL	Neolite	Wet	.79
XL	Leather	Dry	.60
Mark II	Neolite	Dry	.87
Mark II	Neolite	Wet	.73
Mark II	Leather	Dry	.67

Table 2

Wet Properties

Solids	63.3% ≠ .2%
Weight Per Gallon	10.29≠.15 lbs.
pH	8.5≠ .5
Odor	Slight
Appearance	Earthtone
Viscosity	115 - 120 K.U.
VOC's	40 grams per liter
Dry to recoat	6 hours
Dry to foot traffic	24 hours
Dry to vehicular traffic	72 hours

Table 3

Dry Properties

U.V. Resistance	Excellent
Water Resistance	Excellent
Odor	None
Salt Resistance	Excellent
Flexibility	Excellent
Gasoline & motor oil clean-up	Excellent (1)
Tire marking clean-up	Excellent (1)

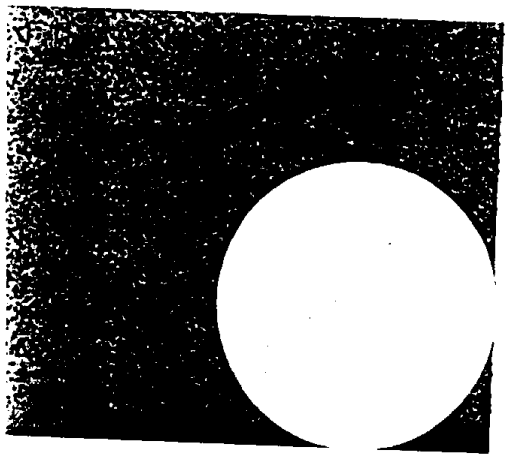
(1) When topcoated (2 coats) with Seal-Krete Concrete Floor and Driveway Sealer

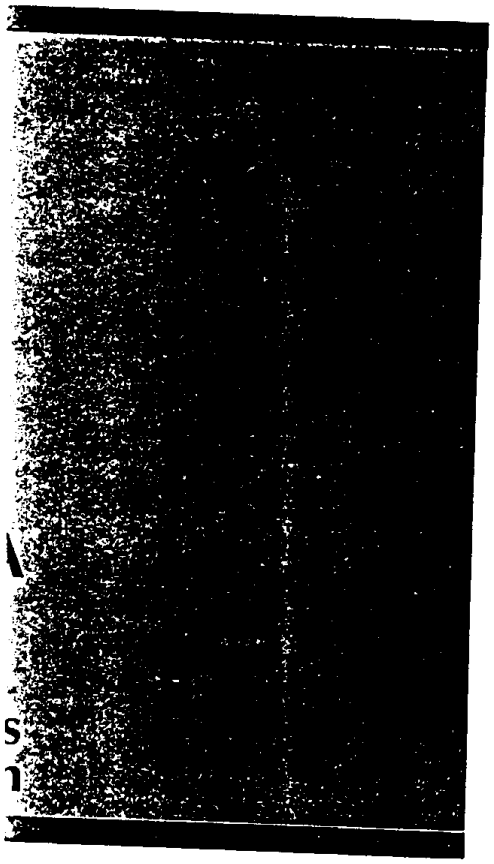
Click here for MSDS on Skid-Proof EZ-Coat

Seal-Krete, Inc.
306 Gandy Road
Auburndale, FL 33823

PH: (863)967-1535
FAX (863)965-2326

SHERWIN WILLIAMS
INDUSTRIAL MAINTENANCE COATINGS
ARMORSEAL™
HEAVY DUTY FLOOR COATINGS
ARMORSEAL 1000
Heavy Duty Marine and Industrial Coating Part A
DECK GRAY B67 AQ 1001
TILE RED B67 RQ 1002
WHITE B67 WQ 1005
HAZE GRAY B67 AQ 1003
SANDSTONE B67 HQ 1004
SAFETY YELLOW B67 YQ 1006
DANGER! FLAMMABLE – VAPOR HARMFUL. IRRITATES EYES, SKIN AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC SKIN REACTION. CAN BE ABSORBED THROUGH THE SKIN. Before using, carefully read CAUTIONS elsewhere on label.
3.78 liters
1 gallon





HEAVY-DUTY MARINE & INDUSTRIAL COATING

For hulls, decks, tanks and superstructures of marine vessels. For masonry and steel structures, storage tanks, pipes, machinery and equipment, concrete floors, etc., in marine and industrial environments.

PIGMENTED RESIN FOR TWO-PART EPOXY RESIN SYSTEM

(Non-Pigmented Hardener Also Required)

SURFACE PREPARATION:

Concrete: Thoroughly clean contaminated areas with commercial degreaser. Acid etch with 15% muriatic acid, rinse well and allow to completely dry.

Steel: Abrasive blast to Commercial Grade SP-6.

Wood: Remove contamination and abrade surface.

Previously Painted Surfaces: Consult your Sherwin-Williams representative for specific performance and application recommendations.

MIXING & APPLICATION INSTRUCTIONS: Pour 1 part resin (pigmented) and 1 part hardener (non-pigmented) into a container and power mix for 2-3 minutes to insure that all pigment is completely dispersed. Allow 30 minutes "sweat-in-time" in covered container before applying. Prime coats are recommended to seal porous surfaces such as concrete and wood. When a prime coat is required, the first coat of ArmorSeal 1000 Series is reduced 1 pint per gallon with R7K54 solvent (after 30 minutes "sweat-in-time"). Allow 8 hours for solvent evaporation and tack free surface before application of second coat. Subsequent coats are not thinned. Antislip additive is mixed into the final coat just prior to application. (EXCEPTION: If antislip is desired with Clear finish, it should be hand broadcast.) When a rust inhibitive primer is required for iron or steel, a coat of ArmorSeal 1014 Rust Inhibitive Epoxy Primer is recommended. Application over rough surfaces will reduce coverage. ArmorSeal 1000 Series epoxy coating is easily sprayed brushed or rolled. A 3/4" pile roller is recommended for the final coat when an antislip aggregate is used. Recommended "airless spray equipment" includes Devilbiss JGA-Gun, Graco Golden Gun, etc. (tip size – 0.015" to 0.021" @ approximately 2500 psi). Material cannot be sprayed if antislip aggregate is used. Clean all equipment with R7K54.

RECOMMENDED SYSTEMS:

Concrete/Wood: 1st coat: ArmorSeal 1000 Series (reduced 1 pint per gallon with R7K54)
2nd coat: ArmorSeal 1000 Series (with antislip aggregate if required)

Steel: 1st coat: ArmorSeal 1014 Rust Inhibitive Primer
2nd coat: ArmorSeal 1000 Series (with antislip aggregate if required)

Painted Surfaces in Sound Condition: 1-2 coats: ArmorSeal 1000 Series

IMPORTANT: When coating previously painted surfaces, always apply test patch and examine for lifting and proper intercoat adhesion. If lifting occurs, remove old coating or apply an appropriate barrier coat.

TECHNICAL INFORMATION:

COVERAGE: 250 to 300 sq. ft./gal. @ 3 to 3.7 mils DFT (23.2 to 27.9 m²/gal. @ 75 to 95 microns DFT)

APPLICATION TEMPERATURES:
55°F minimum to 95°F maximum
(12°C minimum to 35°C maximum)
*Must be 5°F above dew point

RELATIVE HUMIDITY: 85% maximum

SERVICEABILITY:
Recoat – 8 hours minimum @ 72°F (22°C) @ 50% RH
Foot Traffic – 24 hours @ 72°F (22°C) @ 50% RH
Heavy Service – 72 hours @ 72°F (22°C) @ 50% RH
Full Cure – 5 days @ 72°F (22°C) @ 50% RH

MIXING RATIOS: 1:1 equal parts epoxy resin/hardener

INDUCTION: 30 minutes (sweat-in-time)

POT LIFE: 8 hours @ 72°F (22°C)

FLASH POINT: 86°F TCC (30°C)

VISCOSITY: 70-80 Krebs Units

REDUCER: R7K54

10-92

CAUTIONS B0319 (12-92)

Contents are **FLAMMABLE**. Vapors may cause flash fires. Keep away from heat, sparks, and open flame. During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - turn off stoves, electric tools and appliances, and any other sources of ignition. **CONTAINS: ALCOHOLS, AROMATIC HYDROCARBONS, POLYAMIDE RESIN AND XYLENE. VAPOR HARMFUL.** Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. **Do not permit contact with skin and eyes.** Wear neoprene gloves and goggles. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. **FIRST AID:** In case of eye contact, flush thoroughly with large amounts of water for 15 minutes and get medical attention. For skin contact, wash thoroughly with soap and water. In case of respiratory difficulty, provide fresh air and call physician. **If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE:** Contains solvents which can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal. **This product must be mixed with other components before use.** Before opening the packages, READ AND FOLLOW WARNING LABELS ON ALL COMPONENTS.

DO NOT TAKE INTERNALLY
KEEP OUT OF THE REACH OF CHILDREN
FOR PROFESSIONAL USE ONLY
NOT FOR RESIDENTIAL USE
SEE MATERIAL SAFETY DATA SHEET

CAS No.	Ingredient
68410-23-1	Polyamide
6528-34-3	Hansa Yellow
1330-20-7	Xylene
7727-43-7	Barium Sulfate
107-98-2	2-Propanol, 1-methoxy-
95-63-6	1,2,4-trimethylbenzene
108-67-8	1,3,5-trimethylbenzene
64742-95-6	Light Aromatic Hydrocarbons
100-41-4	Ethylbenzene

B67 TO 1006 (11 92)

VOC: 646 gms/L – 5.39 lbs/gal
PHOTOCHEMICALLY REACTIVE

0807019520 * 76

SHERWIN WILLIAMS

The Sherwin-Williams Company
Cleveland, Ohio 44101

102.02

SHERWIN WILLIAMS

A-100®

EXTERIOR LATEX FLAT

A6 SERIES

CHARACTERISTICS

A-100 Exterior Latex Flat is our best quality exterior flat finish. This product is recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: All Exterior ColorAnswers® colors
Coverage:
Recommended: 400 sq ft/gal @4 mils wet; 1.3 mils dry
Drying Time, @ 77°F, 50% RH: temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
Finish: 0-5 units @ 85°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy Base	4-8	100%
Ultradeep Base	8-12	100%
Package Colors	0-4	not controlled

Vehicle Type: Acrylic
VOC (as packaged): 100-156 (less water) 57 grams/liter; ~~0.48 lbs/gal~~
Volume Solids: 32 ± 2%
Weight Solids: 49 ± 2%
Weight per Gallon: 11.1 lbs

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-96D
TT-P-1510A

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. A-100 Exterior Latex Flat
Block
1 ct. PrepRite Block Filler
2 cts. A-100 Exterior Latex Flat
Brick
1 ct. Masonry Conditioner, or
1 ct. ProMar Masonry Conditioner
2 cts. A-100 Exterior Latex Flat
Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Latex Flat
Galvanized Steel
2 cts. A-100 Exterior Latex Flat
Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. A-100 Exterior Latex Flat
Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Latex Flat
Steel, alkyd primer
1 ct. Kem Kromik Universal Metal Primer
2 cts. A-100 Exterior Latex Flat
Steel, latex primer
1 ct. DTM Acrylic Primer/Finish
2 cts. A-100 Exterior Latex Flat
Vinyl Siding
2 cts. A-100 Exterior Latex Flat
Wood, Composition Board
1 ct. A-100 Oil Exterior Wood Primer
2 cts. A-100 Exterior Latex Flat

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull.

Aluminum and Galvanized Steel
Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Brick
All brick must weather at least one year followed by wire brushing to remove all efflorescence. Prime the surface with one coat of Masonry Conditioner.

Exterior Drywall
Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Ext. Acrylic Masonry Primer.

Steel
Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

continued on back

A-100®

EXTERIOR LATEX FLAT

A6 SERIES

SURFACE PREPARATION

Stucco
Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Masonry Acrylic Primer.

Vinyl Siding
Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Composition Board
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth.

Mildew
Remove before painting by washing with a solution of 1 quart liquid bleach and 3 quarts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.

Roller
No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.

Pad
No reduction necessary.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
A6W501

Pigment by Weight	33%
Titanium Dioxide	15.0%
Zinc Oxide	2.0%
Silica/Silicates	16.0%
Vehicle by Weight	67%
Acrylic Resin	12.9%
Water	47.9%
Glycol	2.0%
Mildewcide	0.2%
Additives	4%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50° .
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS
Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB98

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

102.11

SHERWIN WILLIAMS®

A-100®

EXTERIOR LATEX SATIN
A82 SERIES

CHARACTERISTICS

A-100 Exterior Latex Satin is our best quality exterior satin finish. This product is recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: All Exterior ColorAnswers® colors
Coverage:
Recommended: 400 sq ft/gal @ 4 mils wet; 1.3 mils dry
Drying Time, @77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
Finish: 10-20 units @ 60°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy Base	4-8	100%
Package Colors	0-4	not controlled

Vehicle Type: Acrylic
VOC (less exempt solvents): 100 - 110 less water ~~38~~ grams/liter; ~~0.32 lb/gal~~
Volume Solids: 33 ± 2%
Weight Solids: 47 ± 2%
Weight per Gallon: 10.4 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-19D
TT-P-96D (cancelled)
TT-P-1510A (cancelled)

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. A-100 Exterior Latex Satin
Block
1 ct. PrepRite Block Filler
2 cts. A-100 Exterior Latex Satin
Brick
1 ct. Masonry Conditioner
or Loxon Conditioner
2 cts. A-100 Exterior Latex Satin
Cement Composition Siding/Panels
1 ct. Loxon Ext. Acrylic Masonry Primer
or Loxon Conditioner
2 cts. A-100 Exterior Latex Satin
Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Latex Satin
Galvanized Steel
2 cts. A-100 Exterior Latex Satin
Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. A-100 Exterior Latex Satin
Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Latex Satin
Steel
1 ct. Kem Kromik Universal Metal Primer
or DTM Acrylic Primer/Finish
2 cts. A-100 Exterior Latex Satin
Vinyl Siding
2 cts. A-100 Exterior Latex Satin
Wood, Composition Board
1 ct. A-100 Exterior Oil Wood Primer
2 cts. A-100 Exterior Latex Satin

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with PrepRite ProBlock Primer Sealer.

Aluminum & Galvanized Steel— Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall— Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Cement Composition Siding/Panels
Clean thoroughly. Do not pressure wash, the pressure may damage the panels. Allow the surface to dry thoroughly. Prime bare panels with an acrylic primer.

Steel—Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

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A-100®

EXTERIOR LATEX SATIN

A82 SERIES

SURFACE PREPARATION

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Plywood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew—Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.
Roller
No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.
Pad
No reduction necessary.
Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
A82W510

Pigment by Weight	25%
Titanium Dioxide	20%
Zinc Oxide	2%
Silica/Silicates	3%
Vehicle by Weight	75%
Acrylic Resin	20%
Water	49%
Additives	6%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS
Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB98

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

SHERWIN WILLIAMS

A-100®

EXTERIOR GLOSS LATEX

A8 SERIES

CHARACTERISTICS

A-100 Exterior Latex Gloss is our best quality exterior gloss finish. This product is recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: All Exterior ColorAnswers® colors

Coverage:
Recommended: 400 sq ft/gal @4 mils wet; 1.3 mils dry

Drying Time, @77°F, 50% RH: temperature and humidity dependent
Touch: 1 hour
Recoat: 24 hours

Flash Point: 201°F, PMCC
Finish: 35-45 units @ 60°
Solvent/Reducer: Water

Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
BaseA, B, C	4-8	100%
Burgundy Base	4-8	100%
Package Colors	0-4	not controlled

Vehicle Type: Acrylic
VOC (as packaged): 132-156 g/l
less water ~~152~~ ~~grams/liter~~; ~~1.06 lbs/gal~~
Volume Solids: 33 ± 2%
Weight Solids: 44 ± 2%
Weight per Gallon: 10.0 lb

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. A-100 Exterior Gloss Latex

Block
1 ct. PrepRite Block Filler
2 cts. A-100 Exterior Gloss Latex

Brick
1 ct. Masonry Conditioner
or ProMar Masonry Conditioner
2 cts. A-100 Exterior Gloss Latex

Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Gloss Latex

Galvanized Steel
2 cts. A-100 Exterior Gloss Latex

Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. A-100 Exterior Gloss Latex

Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. A-100 Exterior Gloss Latex

Steel, alkyd primer
1 ct. Kem Kromik Universal Metal Primer
2 cts. A-100 Exterior Gloss Latex

Steel, latex primer
1 ct. DTM Acrylic Primer/Finish
2 cts. A-100 Exterior Gloss Latex

Vinyl Siding
2 cts. A-100 Exterior Gloss Latex

Wood, Composition Board
1 ct. A-100 Exterior Oil Wood Primer
2 cts. A-100 Exterior Gloss Latex

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with PrepRite ProBlock Primer Sealer.

Aluminum & Galvanized Steel—Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall—Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Steel—Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

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A-100®

EXTERIOR GLOSS LATEX
A8 SERIES

SURFACE PREPARATION

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Plywood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew—Remove before painting by washing with a solution of 1 quart liquid bleach and 3 quarts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.
Roller
No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.
Pad
No reduction necessary.

Spray—Airless	
Pressure	2000 psi
Tip	.019" - .021"
Reduction	none

Spray—Conventional	
Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
A8W16

Pigment by Weight	19%
Titanium Dioxide	17%
Zinc Oxide	2%
Vehicle by Weight	81%
Acrylic Resin	23%
Water	52%
Glycol/Alcohol/Esters	4%
Mildewcide	0.2%
Additives	1.8%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS
Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB98

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SHERWIN WILLIAMS

Duration™

EXTERIOR LATEX FLAT COATING
K32 SERIES

DESCRIPTION

Duration™ Exterior Latex Coating is the result of advances in acrylic technology. **Duration** uses **PermaLast™** technology to provide you with the most durable and longest lasting coating available for protecting the outside of your home.

Performance

- One Coat Protection
- Self-Priming
- Easy Application
- Superior Hiding
- Thicker. More Flexible
- Resists Blistering and Peeling

Projects

- Homes
- Windows
- Gutters
- Trim
- Architectural plastics, such as shutters & gutters

Surfaces

- Wood
- Stucco
- Masonry/Cement Composition Panels
- Aluminum Siding
- Vinyl Siding
- Galvanized Metal

MILDEW RESISTANT. This coating contains agents that inhibit the growth of mildew on the surface of this coating.

CHARACTERISTICS

Color: all ColorAnswers® colors

Coverage:

Recommended: 250-300 sq ft/gal
up to 7.0 mils wet; 2.8 mils dft

Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent

Touch:	1 hour
Recoat:	4 hours
Flash Point:	201°F, PMCC
Finish:	0-5 units @ 85°
Solvent/Reducer:	Water

Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-5	125%
Base A, B, C	5-10	125%
Burgundy	5-10	125%

Vehicle Type:	Acrylic
VOC:	109 grams/liter; 0.91 lb/gal
Volume Solids:	40 ± 2%
Weight Solids:	58 ± 2%
Weight per Gallon:	11.8 lb

APPLICATION

Thoroughly follow the recommended surface preparations. On repaint work, apply one coat of **DURATION** coating; on bare surfaces, apply two coats of **DURATION**, allowing 4 hours drying between coats.

Apply using a brush, roller, or sprayer. Thinning not normally required. Do not paint in direct sun. Apply at temperatures above 50°F. During application at temperatures above 80°F, **DURATION** sets up quickly. Some adjustment in your painting approach may be required. Paint from a dry area into the adjoining wet coating area. Dries to touch in 1 hour and is ready for service overnight.

Previously Painted Surfaces — Spot prime bare areas with **DURATION**, wait 4 hours, and paint the entire surface. Some specific surfaces require specialized treatment.

Unpainted Surfaces — **DURATION** can be used as a self-priming coating on many bare surfaces. When used this way, the first coat of **DURATION** acts like a coat of primer and the second coat provides the final appearance and performance. However, some specific surfaces require specialized treatment.

See following surface preparations.

No reduction necessary.

Brush - Use a nylon/polyester brush.

Roller - Use a 3/8" - 3/4" nap synthetic cover.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"
Reduction	none

CLEANUP INFORMATION

Clean hands and tools ***immediately*** after use with soap and warm water. The ***PermaLast*** technology in **DURATION** coating, which creates the tenacious bond to the surface, also creates a tenacious bond to applicators and any other surface it comes in contact with. You may want to clean occasionally during use. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

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Duration™

EXTERIOR LATEX FLAT COATING
K32 SERIES

SURFACE PREPARATION

Most coating failures are due to inadequate surface preparation or application. Thorough surface preparation will help provide long term protection with DURATION coating.
Remove all surface contamination, including mildew and chalk, by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Scrape and sand existing peeled or cracked paint to a sound surface. Remove any oil or grease with a water-based degreasing cleaner. Sand glossy surfaces dull. All rust must be removed. Seal stains from water, smoke, graffiti, grease, etc. with PrepRite ProBlock Primer/Sealer.
Caulking—After cleaning the surface thoroughly, caulk around windows, doors, and other openings with Sherwin-Williams Exterior Caulk after spot priming any bare surfaces in these areas with **DURATION** or other appropriate primer.
Aluminum and Galvanized Steel - Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method. After cleaning any corrosion from galvanized steel, apply 1 coat of Sherwin-Williams' **All Surface Enamel Primer** to the cleaned area.
Cement Composition Siding/Panels - Pressure clean, if needed, with a minimum of 2100 psi pressure to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, and peeling or defective coatings. Allow the surface to dry thoroughly. If the surface is new, test it for pH, if the pH is higher than 8, prime with **Loxon® Exterior Masonry Primer**.
Cement, Concrete, Masonry, Block - All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with **Loxon Exterior Acrylic Masonry Primer**. If a smoother finish is desired on rough surfaces, use **Loxon Block Surfacer or PrepRite Block Filler**. After power washing, previously painted masonry may still have a powdery surface that should be sealed with **Loxon Conditioner** and then apply 1 coat of **DURATION**.

SURFACE PREPARATION

Composition Board/Hardboard — Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Because of the potential for wax bleeding out of the substrate, we recommend 1 coat of **A-100® Exterior Oil Primer** and then 1 coat of **DURATION.**
Exterior Drywall - Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.
Steel - Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. To prevent surface rusting on bare steel, apply 1 coat of Sherwin-Williams' **All Surface Enamel Primer** and then 1 coat of **DURATION**.
Stucco - Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with **Loxon Exterior Masonry Acrylic Primer**.
Vinyl Siding - Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly. Do not paint vinyl siding with any color darker than the original color. Painting with darker colors may cause the siding to warp.
Wood - Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Knots and some woods, such as redwood and cedar, contain a high amount of tannin, a colored wood extract. If applied to these bare woods, the first coat of **DURATION** may show some staining, but it will be trapped in the first coat. A second coat will uniform the appearance. If staining persists, spot prime severe areas with 1 coat of **A-100 Exterior Oil Wood Primer** prior to using **DURATION**.

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F .
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS
Contains ANTIMONY and ZINC.
Use only with adequate ventilation. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area.
Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.
WARNING: This product contains chemicals known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY.
KEEP OUT OF THE REACH OF CHILDREN.
Do not apply on toys and other children's articles or furniture.
11/98

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SHERWIN WILLIAMS

Duration™

EXTERIOR LATEX SATIN COATING
K33 SERIES

DESCRIPTION

DURATION™ Exterior Latex Coating is the result of advances in acrylic technology. **DURATION** uses **PermaLast™** technology to provide you with the most durable and longest lasting coating available for protecting the outside of your home.

Performance

- One Coat Protection
- Self-Priming
- Easy Application
- Superior Hiding
- Thicker. More Flexible
- Resists Blistering and Peeling

Projects

- Homes
- Windows
- Gutters
- Trim
- Architectural plastics, such as shutters & gutters

Surfaces

- Wood
- Stucco
- Masonry/Cement Composition Panels
- Aluminum Siding
- Vinyl Siding
- Galvanized Metal

MILDEW RESISTANT. This coating contains agents that inhibit the growth of mildew on the surface of this coating.

CHARACTERISTICS

Color: all ColorAnswers® colors

Coverage:

Recommended: 250-300 sq ft/gal
up to 7.0 mils wet; 2.8 mils dft

Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent

Touch: 1 hour

Recoat: 4 hours

Flash Point: 201°F, PMCC

Finish: 10-20 units @ 60°

Solvent/Reducer: Water

Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-5	125%
Base A, B, C	5-10	125%
Burgundy	5-10	125%

Vehicle Type: Acrylic

VOC: 68-120 grams/liter (less water); ~~0.80 lbs/gal~~

Volume Solids: 40 ± 2%

Weight Solids: 55 ± 2%

Weight per Gallon: 10.9 lb

APPLICATION

Thoroughly follow the recommended surface preparations. On repaint work, apply one coat of **DURATION** coating; on bare surfaces, apply two coats of **DURATION**, allowing 4 hours drying between coats.

Apply using a brush, roller, or sprayer. Thinning not normally required. Do not paint in direct sun. Apply at temperatures above 50°F. During application at temperatures above 80°F, **DURATION** sets up quickly. Some adjustment in your painting approach may be required. Paint from a dry area into the adjoining wet coating area. Dries to touch in 1 hour and is ready for service overnight.

Previously Painted Surfaces — Spot prime bare areas with **DURATION**, wait 4 hours, and paint the entire surface. Some specific surfaces require specialized treatment.

Unpainted Surfaces — **DURATION** can be used as a self-priming coating on many bare surfaces. When used this way, the first coat of **DURATION** acts like a coat of primer and the second coat provides the final appearance and performance. However, some specific surfaces require specialized treatment.

See following surface preparations.

No reduction necessary.

Brush - Use a nylon/polyester brush.

Roller - Use a 3/8" - 3/4" nap synthetic cover.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"
Reduction	none

CLEANUP INFORMATION

Clean hands and tools ***immediately*** after use with soap and warm water. The ***PermaLast*** technology in **DURATION**, which creates the tenacious bond to the surface, also creates a tenacious bond to applicators and any other surface it comes in contact with. You may want to clean occasionally during use.

After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

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Duration™

EXTERIOR LATEX SATIN COATING

K33 SERIES

SURFACE PREPARATION

Most coating failures are due to inadequate surface preparation or application. Thorough surface preparation will help provide long term protection with DURATION coating.
Remove all surface contamination, including mildew and chalk, by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Scrape and sand existing peeled or cracked paint to a sound surface. Remove any oil or grease with a water-based degreasing cleaner. Sand glossy surfaces dull. All rust must be removed. Seal stains from water, smoke, graffiti, grease, etc. with PrepRite ProBlock Primer/Sealer.
Caulking—After cleaning the surface thoroughly, caulk around windows, doors, and other openings with Sherwin-Williams Exterior Caulk after spot priming any bare surfaces in these areas with **DURATION** or other appropriate primer.
Aluminum and Galvanized Steel - Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method. After cleaning any corrosion from galvanized steel, apply 1 coat of Sherwin-Williams' **All Surface Enamel Primer** to the cleaned area.
Cement Composition Siding/Panels - Pressure clean, if needed, with a minimum of 2100 psi pressure to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, and peeling or defective coatings. Allow the surface to dry thoroughly. If the surface is new, test it for pH, if the pH is higher than 8, prime with **Loxon® Exterior Masonry Primer**.
Cement, Concrete, Masonry, Block - All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with **Loxon Exterior Acrylic Masonry Primer**. If a smoother finish is desired on rough surfaces, use Loxon

SURFACE PREPARATION

Block Surfacer or PrepRite Block Filler. After power washing, previously painted masonry may still have a powdery surface that should be sealed with **Loxon Conditioner** and then apply 1 coat of **DURATION**.
Composition Board/Hardboard — Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Because of the potential for wax bleeding out of the substrate, we recommend 1 coat of **A-100® Exterior Oil Primer** and then 1 coat of **DURATION.**
Exterior Drywall - Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.
Steel - Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. To prevent surface rusting on bare steel, apply 1 coat of Sherwin-Williams' **All Surface Enamel Primer** and then 1 coat of **DURATION**.
Stucco - Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with **Loxon Exterior Masonry Acrylic Primer**.
Vinyl Siding - Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly. Do not paint vinyl siding with any color darker than the original color. Painting with darker colors may cause the siding to warp.
Wood - Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Knots and some woods, such as redwood and cedar, contain a high amount of tannin, a colored wood extract. If applied to these bare woods, the first coat of **DURATION** may show some staining, but it will be trapped in the first coat. A second coat will uniform the appearance. If staining persists, spot prime severe areas with 1 coat of **A-100 Exterior Oil Wood Primer** prior to using **DURATION**.

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50° .
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS
Contains ANTIMONY and ZINC.
Use only with adequate ventilation. If you experience eye watering, headaches, or dizziness, increasefresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) orleave the area.
Avoid contact with eyes and skin. Wash hands after using. Keep containerclosed when not in use. Do not transfer contents to other containers forstorage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts ofwater. Get medical attention if irritation persists. If swallowed, get medicalattention immediately.
WARNING: This product contains chemicals known to the State of California tocause cancer.
DO NOT TAKE INTERNALLY.
KEEP OUT OF THE REACH OF CHILDREN.
Do not apply on toys and other children's articles or furniture.
11/98

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

102.01

SHERWIN WILLIAMS

SUPERPAINT®

EXTERIOR LATEX FLAT

A80 SERIES

CHARACTERISTICS

SuperPaint Exterior Latex Flat is our finest quality exterior flat finish. This product is recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: All ColorAnswers® colors
Coverage:
Recommended: 400 sq ft/gal @ 4.0 mils wet; 1.4 mils dry
Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
Finish: 0-5 units @ 85°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy Base	4-8	100%
Package Colors	0-4	not controlled

Vehicle Type: Acrylic
VOC (less exempt solvents):
139 grams/liter; 1.16 lb/gal
Volume Solids: 34 ± 2%
Weight Solids: 51 ± 2%
Weight per Gallon: 11.2 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-19D
TT-P-96D (cancelled spec)
TT-P-1510A (cancelled spec)
TT-E-2784A, Type III

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. SuperPaint Exterior Latex Flat
Block
1 ct. PrepRite Block Filler
2 cts. SuperPaint Exterior Latex Flat
Brick
1 ct. Loxon Conditioner
2 cts. SuperPaint Exterior Latex Flat
Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior Latex Flat
Galvanized Steel
2 cts. SuperPaint Exterior Latex Flat
Masonry/Cement/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. SuperPaint Exterior Latex Flat
Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior Latex Flat
Steel, alkyd primer
1 ct. Kem Kromik Universal Metal Primer
2 cts. SuperPaint Exterior Latex Flat
Steel, latex primer
1 ct. DTM Acrylic Primer/Finish
2 cts. SuperPaint Exterior Latex Flat
Vinyl Siding
2 cts. SuperPaint Exterior Latex Flat
Wood, Composition Board
1 ct. A-100 Alkyd Exterior Wood Primer
2 cts. SuperPaint Exterior Latex Flat

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull.

Aluminum and Galvanized Steel
Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Brick
All brick must weather at least one year followed by wire brushing to remove all efflorescence. Prime the surface with one coat of Masonry Conditioner.

Exterior Drywall
Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Ext. Acrylic Masonry Primer.

Steel
Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

Continued on back

SUPERPAINT®

EXTERIOR LATEX FLAT

A80 SERIES

SURFACE PREPARATION

Stucco
Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Masonry Acrylic Primer.

Vinyl Siding
Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Composition Board
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth.

Mildew
Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking
After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.
Roller
No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.
Pad
No reduction necessary.
Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

LABEL ANALYSIS
A80W507

Pigment by Weight	35%
Titanium Dioxide	19%
Zinc Oxide	2%
Silica/Silicates	14%
Vehicle by Weight	65%
Acrylic Resin	14%
Water	45%
Glycols/Alcohols/Esters	4%
Mildewcide	0.3%
Additives	1.7%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS
Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB98 6/98

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

SHERWIN WILLIAMS

SUPERPAINT®

EXTERIOR LATEX SATIN

A89 SERIES

CHARACTERISTICS

SuperPaint Exterior Latex Satin is our finest quality exterior satin finish. This product is recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: All Exterior ColorAnswers® colors
Coverage:
Recommended: 400 sq ft/gal
@4 mils wet; 1.44 mils dry
Drying Time, @ 77°F 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
Finish: 10-20 units @ 85°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy Base	4-8	100%
Package Colors	0-4	not controlled

Vehicle Type: Acrylic
VOC (less exempt solvents):
110 grams/liter; 0.92 lb/gal
Volume Solids: 36 ± 2%
Weight Solids: 50 ± 2%
Weight per Gallon: 10.5 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-19D
TT-P-96D (cancelled spec)
TT-P-1510A (cancelled spec)

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. SuperPaint Exterior Latex Satin
Block
1 ct. PrepRite Block Filler
2 cts. SuperPaint Exterior Latex Satin
Brick
1 ct. Loxon Conditioner
2 cts. SuperPaint Exterior Latex Satin
Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior Latex Satin
Galvanized Steel
2 cts. SuperPaint Exterior Latex Satin
Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. SuperPaint Exterior Latex Satin
Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior Latex Satin
Steel, alkyd primer
1 ct. Kem Kromik Universal Metal Primer
2 cts. SuperPaint Exterior Latex Satin
Steel, latex primer
1 ct. DTM Acrylic Primer/Finish
2 cts. SuperPaint Exterior Latex Satin
Vinyl Siding
2 cts. SuperPaint Exterior Latex Satin
Wood, Composition Board
1 ct. A-100 Exterior Oil Wood Primer
2 cts. SuperPaint Exterior Latex Satin

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with PrepRite ProBlock Primer Sealer.

Aluminum & Galvanized Steel
Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall
Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Steel
Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

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SUPERPAINT®

EXTERIOR LATEX SATIN

A89 SERIES

SURFACE PREPARATION

Stucco
Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl
Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Plywood, Composition Board
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew
Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking
After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
Use a nylon/polyester brush.
Roller
Use a 3/8" - 3/4" nap synthetic roller cover.
Spray—Airless

Pressure	2000 psi
Tip	.015"-.017"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	10-20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
A89W507

Pigment by Weight	25%
Titanium Dioxide	20%
Zinc Oxide	2%
Silica/Silicates	3%
Vehicle by Weight	75%
Acrylic Resin	22%
Water	46%
Additives	7%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS
Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB98 6/98

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102.20

SHERWIN WILLIAMS

SUPERPAINT®

EXTERIOR GLOSS LATEX

A84 SERIES

CHARACTERISTICS

SuperPaint Exterior Gloss Latex is our finest quality exterior gloss finish. This product is recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: All Exterior ColorAnswers colors

Coverage:
Recommended: 400 sq ft/gal @4 mils wet; 1.4 mils dry

Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 24 hours

Flash Point: 201°F, PMCC
Finish: 35-45 units @ 60°
Solvent/Reducer: Water

Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy Base	4-8	100%
Package Colors	0-4	not controlled

Vehicle Type: Acrylic
VOC (as packaged): 120 - 156
(Less water) ~~51~~ grams/liter; ~~0.43 lbs/gal~~
Volume Solids: 36 ± 2%
Weight Solids: 48 ± 2%
Weight per Gallon: 10.3 lbs

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. SuperPaint Exterior Gloss Latex

Block
1 ct. PrepRite Block Filler
2 cts. SuperPaint Exterior Gloss Latex

Brick
1 ct. Masonry Conditioner
or ProMar Masonry Conditioner
2 cts. SuperPaint Exterior Gloss Latex

Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior Gloss Latex

Galvanized Steel
2 cts. SuperPaint Exterior Gloss Latex

Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. SuperPaint Exterior Gloss Latex

Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior Gloss Latex

Steel, alkyd primer
1 ct. Kem Kromik Universal Metal Primer
2 cts. SuperPaint Exterior Gloss Latex

Steel, latex primer
1 ct. DTM Acrylic Primer/Finish
2 cts. SuperPaint Exterior Gloss Latex

Vinyl Siding
2 cts. SuperPaint Exterior Gloss Latex

Wood, Composition Board
1 ct. A-100 Exterior Oil Wood Primer
2 cts. SuperPaint Exterior Gloss Latex

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with PrepRite ProBlock Primer Sealer.

Aluminum & Galvanized Steel—Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall—Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Steel—Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

Continued on back

SUPERPAINT®
EXTERIOR GLOSS LATEX
A84 SERIES

SURFACE PREPARATION

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Plywood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew—Remove before painting by washing with a solution of 1 quart liquid bleach and 3 quarts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.
Roller
No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.
Pad
No reduction necessary.
Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
A84W507

Pigment by Weight	21%
Titanium Dioxide	19%
Zinc Oxide	2%
Vehicle by Weight	79%
Acrylic Resin	24%
Water	47%
Glycols/Alcohols/Esters	3%
Mildewcide	0.3%
Additives	4.7%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS
Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB98

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SHERWIN WILLIAMS

ATTACHMENT 17 page 1

SUPERPAINT®

EXTERIOR HIGH GLOSS LATEX ENAMEL

A85 SERIES

CHARACTERISTICS

SuperPaint Latex High Gloss Enamel

Recommended for:

- Doors
- Windows
- Trim
- Shutters

Use on:

- Wood
- Metal—Aluminum, Galvanized, Primed Steel
- Masonry, Cement, Brick, Block
- Stucco
- Vinyl trim, Shutters

Superior Performance in:

- Block Resistance
- Moisture Resistance
- Gloss Retention
- Flow and Leveling

Color: All exterior ColorAnswers colors

Coverage: 400 sq ft/gal @4 mils wet: 1.32 mils dry

Drying Time, @ 77°F, 50% RH: temperature and humidity dependent

Touch:	1 hour
Tack Free:	4 hours
Recoat:	24 hours

Flash Point: 201°F, PMCC

Finish: 70+ units @ 60°

Solvent/Reducer: Water

Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Red Base	4-8	100%
Neutral Base	8-12	100%
Package colors	0-4	not controlled

Vehicle Type: Acrylic

VOC (less exempt solvents): 110-132 (less water) ~~148~~ grams/liter; ~~0.98 lbs/gal~~

Volume Solids: 43 ± 2%

Weight Solids: 54 ± 2%

Weight per Gallon: 10.3 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification: TT-E-2784A, Type I, Gloss

SPECIFICATIONS

Aluminum
1 ct. DTM Acrylic Primer/Finish
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Galvanized Steel
1 ct. DTM Acrylic Primer/Finish
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Steel
1 ct. Kem Kromik Universal Metal Primer
or DTM Acrylic Primer/Finish
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Vinyl
2 cts. SuperPaint Exterior High Gloss Latex Enamel

Wood, Composition Board
1 ct. A-100 Exterior Oil Wood Primer
2 cts. SuperPaint Exterior High Gloss Latex Enamel

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull.

Aluminum & Galvanized Steel
Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall
Fill cracks and nail holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Steel
Rust and mill scale must be removed using sandpaper, steel wool or other abrading method. Bare steel must be primed the same day as cleaned.

Stucco
Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl
Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Continued on back

SUPERPAINT®

EXTERIOR HIGH GLOSS LATEX ENAMEL

A85 SERIES

SURFACE PREPARATION

Wood, Composition Board
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew - Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS

A85W507

Pigment by Weight	15%
Titanium Dioxide	15%
Vehicle by Weight	85%
Acrylic Resin	48%
Styrene Acrylic	6%
Water	24%
Glycol	4%
Additives	3%
Total	100%

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.

Roller
No reduction necessary. Use a 3/8"-1/2" SherFab roller cover.

Spray—Airless

Pressure	2000 psi
Tip	.013"-.017"
Reduction	none

SuperPaint High Gloss Enamel sets up very quickly, providing painted surfaces which resists sticking together (blocking). When used at normal temperature and humidity, windows and doors can be closed after 4 hours drying. Maximum blocking resistance is achieved after 24 hours. With this benefit, some adjustments to your painting approach must be made.

- Do not paint in direct sun. Temperatures over 80°F and humidities under 30% will make the paint set up quicker.
- Do not over-work the product. Load paint on the surface, spread to cover, smooth out with long, even strokes. Finish this area before moving to a new area. Do not attempt to brush back into and further uniform an area once finished.
- Work quickly to maintain a wet edge.
- Paint objects in a vertical position to reduce the collection of airborne dirt and dust on the drying paint.

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.
Do not shake excessively.
Not for use on roofs, floors, or decks.
Do not use Red, Yellow, or Violet Blend-A-Color Toner for exterior use.

LABEL CAUTION
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.
WARNING: This product contains chemicals known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB528-4/98

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

SHERWIN WILLIAMS

ATTACHMENT 18 page 1

TOUGH ONE®

EXTERIOR LATEX FLAT

C1 SERIES

CHARACTERISTICS

Tough One Exterior Latex Flat is an economical finish for residential use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color: Many ColorAnswers colors
Coverage:
Recommended: 400 sq ft/gal @ 4 mils wet; 1.0 mils dry
Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent
Touch: 1 hour
Recoat: 4 hours
Flash Point: 201°F, PMCC
Finish: 0-10 units @ 85°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
White	0-4	not controlled

Vehicle Type: Acrylic
VOC: 43 grams/liter; 0.36 lb/gal
Volume Solids: 25 ± 2%
Weight Solids: 41 ± 2%
Weight per Gallon: 10.5 lb

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. Tough One Exterior Latex Flat
Block
1 ct. PrepRite Block Filler
2 cts. Tough One Exterior Latex Flat
Brick
1 ct. Loxon Conditioner
2 cts. Tough One Exterior Latex Flat
Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. Tough One Exterior Latex Flat
Galvanized Steel
1 ct. All Surface Enamel Latex Primer
2 cts. Tough One Exterior Latex Flat
Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. Tough One Exterior Latex Flat
Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. Tough One Exterior Latex Flat
Steel, alkyd primer
1 ct. All Surface Enamel Oil Primer
2 cts. Tough One Exterior Latex Flat
Steel, latex primer
1 ct. All Surface Enamel Latex Primer
2 cts. Tough One Exterior Latex Flat
Vinyl Siding
2 cts. Tough One Exterior Latex Flat
Wood, Composition Board
1 ct. WeatherPerfect Alkyd Exterior Undercoater
2 cts. Tough One Exterior Latex Flat

SURFACE PREPARATION

Remove all surface contamination by washing with ProClean All Surface Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite ProBlock Primer Sealer.

Aluminum and Galvanized Steel
Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper or other abrading method.

Brick
All brick must weather at least one year followed by wire brushing to remove all efflorescence. Prime the surface with one coat of Loxon Conditioner.

Exterior Drywall
Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Ext. Acrylic Masonry Primer. Repair cracks, voids, and other holes using ConSeal Patches and Sealants.

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TOUGH ONE®

EXTERIOR LATEX FLAT

C1 SERIES

SURFACE PREPARATION

Steel
Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

Stucco
Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Masonry Acrylic Primer.

Vinyl Siding
Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Composition Board
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth.

Mildew
Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Apply at temperatures above 50°F.
No reduction necessary.
Brush
Use a nylon/polyester brush.
Roller
Use a 3/8" - 3/4" nap synthetic roller cover.
Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

LABEL ANALYSIS
C1W502

Pigment by Weight	29%
Titanium Dioxide	9%
Zinc Oxide	1%
Silica/Silicates	19%
Vehicle by Weight	71%
Acrylic Resin	8%
Water	58%
Soya Aikyd	1%
Mildewcide	0.1%
Additives	3.9%
Total	100%

CAUTIONS

For exterior use only.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS
Contains CRYSTALLINE SILICA
Use only with adequate ventilation. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area.
Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.
DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB366 4/99
25 00

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

102.03

SHERWIN WILLIAMS

WEATHERPERFECT®
EXTERIOR LATEX FLAT
B36 SERIES

CHARACTERISTICS

WeatherPerfect Exterior Latex Flat House & Trim is recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color:	All ColorAnswers® colors
Coverage:	
Recommended:	400 sq ft/gal @4 mils wet; 1.3 mils dry
Drying Time, @ 77°F, 50% RH:	temperature and humidity dependent
Touch:	1 hour
Recoat:	4 hours
Flash Point:	201°F, PMCC
Flat — **Finish:**	0-5 units @ 85°
Solvent/Reducer:	Water

Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy	4-8	100%
Yellow Corn	4-8	100%
Package Colors	0-4	not controlled

Vehicle Type:	Vinyl Acrylic
VOC (as packaged):	110-120 g/l or less water ~~42 grams/liter; 0.35 lbs/gal~~
Volume Solids:	32 ± 2%
Weight Solids:	48 ± 2%
Weight per Gallon:	10.8 lb

Provides performance which is comparable to the products that are formulated in accordance with federal specification:

TT-P-19D
TT-P-96D
TT-P-1510A

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. WeatherPerfect Exterior Latex Flat

Block
1 ct. PrepRite Block Filler
2 cts. WeatherPerfect Exterior Latex Flat

Brick
1 ct. Masonry Conditioner
or ProMar Masonry Conditioner
2 cts. WeatherPerfect Exterior Latex Flat

Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. WeatherPerfect Exterior Latex Flat

Galvanized Steel
1 ct. DTM Acrylic Primer/Finish
2 cts. WeatherPerfect Exterior Latex Flat

Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. WeatherPerfect Exterior Latex Flat

Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. WeatherPerfect Exterior Latex Flat

Steel, alkyd primer
1 ct. Kem Kromik Universal Metal Primer
2 cts. WeatherPerfect Exterior Latex Flat

Steel, latex primer
1 ct. DTM Acrylic Primer/Finish
2 cts. WeatherPerfect Exterior Latex Flat

Vinyl Siding
2 cts. WeatherPerfect Exterior Latex Flat

Wood, Composition Board
1 ct. WeatherPerfect Alkyd Exterior Undercoater
2 cts. WeatherPerfect Exterior Latex Flat

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with PrepRite ProBlock Primer Sealer.

Aluminum & Galvanized Steel—Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall—Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Steel—Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

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WeatherPerfect®
Exterior Latex Flat
B36 Series

SURFACE PREPARATION

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Plywood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew—Remove before painting by washing with a solution of 1 quart liquid bleach and 3 quarts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.
Roller
No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.
Pad
No reduction necessary.
Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
B36W306

Pigment by Weight	33%
Titanium Dioxide	19%
Zinc Oxide	1%
Silica/Silicates	13%
Vehicle by Weight	67%
Vinyl/Acrylic Polymer	12%
Water	48%
Mildewcide	0.1%
Glycol	2%
Additives	4.9%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS
Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB98

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102.12

SHERWIN WILLIAMS

WEATHERPERFECT®
EXTERIOR LATEX SATIN
B77 SERIES

CHARACTERISTICS

WeatherPerfect Exterior Latex Satin is a quality satin finish recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and metal.

Color:	All ColorAnswers® colors
Coverage:	
Recommended:	400 sq ft/gal @4 mils wet; 1.4 mils dry
Drying Time, @77°F, 50% RH: temperature and humidity dependent	
Touch:	1 hour
Recoat:	24 hours
Flash Point:	201°F, PMCC
AT → Finish:	10-20 units @ 85°
Solvent/Reducer:	Water

Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy	4-8	100%
White	0-4	not controlled

Vehicle Type:	Vinyl Acrylic
VOC (as packaged):	110-120 gl ℓ less ~~water 42 grams/liter, 0.35 lbs/gal~~
Volume Solids:	34 ± 2%
Weight Solids:	47 ± 2%
Weight per Gallon:	10.4 lb

SPECIFICATIONS

Aluminum & Aluminum Siding
2 cts. WeatherPerfect Exterior Latex Satin

Block
1 ct. PrepRite Block Filler
2 cts. WeatherPerfect Exterior Latex Satin

Brick
1 ct. Masonry Conditioner
or ProMar Masonry Conditioner
2 cts. WeatherPerfect Exterior Latex Satin

Exterior Drywall
1 ct. A-100 Exterior Latex Wood Primer
2 cts. WeatherPerfect Exterior Latex Satin

Galvanized Steel
2 cts. WeatherPerfect Exterior Latex Satin

Masonry/Stucco
1 ct. Loxon Ext. Acrylic Masonry Primer
2 cts. WeatherPerfect Exterior Latex Satin

Plywood
1 ct. A-100 Exterior Latex Wood Primer
2 cts. WeatherPerfect Exterior Latex Satin

Steel, alkyd primer
1 ct. Kem Kromik Universal Metal Primer
2 cts. WeatherPerfect Exterior Latex Satin

Steel, latex primer
1 ct. DTM Acrylic Primer/Finish
2 cts. WeatherPerfect Exterior Latex Satin

Vinyl Siding
2 cts. WeatherPerfect Exterior Latex Satin

Wood, Composition Board
1 ct. WeatherPerfect Alkyd Exterior Undercoater
2 cts. WeatherPerfect Exterior Latex Satin

SURFACE PREPARATION

Remove all surface contamination by washing with an appropriate cleaner, rinse and allow to dry. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Seal stains from water, smoke, ink, pencil, grease, etc., with PrepRite ProBlock Primer Sealer.

Aluminum & Galvanized Steel—Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Exterior Drywall—Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block
All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

Steel—Rust and mill scale must be removed using sandpaper, steel wool, or other abrading method. Bare steel must be primed the same day as cleaned.

Continued on back

WeatherPerfect®
Exterior Latex Satin
B77 Series

SURFACE PREPARATION

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Plywood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. All patched areas must be primed.

Mildew—Remove before painting by washing with a solution of 1 quart liquid bleach and 3 quarts of water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Brush
No reduction necessary. Use a nylon/polyester brush.
Roller
No reduction necessary. Use a 3/8" - 3/4" nap synthetic roller cover.
Pad
No reduction necessary.
Spray—Airless

Pressure	2000 psi
Tip	.019" - .021"
Reduction	none

Spray—Conventional

Air Pressure	40-60 psi
Fluid Pressure	20 psi
Cap/Tip	704/FX
Reduction	up to 1 pint/gallon

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturers safety recommendations when using mineral spirits.

LABEL ANALYSIS
B77W506

Pigment by Weight	25%
Titanium Dioxide	19%
Zinc Oxide	1%
Silica/Silicates	5%
Vehicle by Weight	75%
Vinyl/Acrylic Polymer	15%
Water	50%
Glycols/Alcohols/Esters	3%
Mildewcide	0.1%
Additives	6.9%
Total	100%

CAUTIONS

For exterior use only.
Do not apply at temperatures below 50°F.
Protect from freezing.
Non-photochemically reactive.

LABEL CAUTIONS
Contains CRYSTALLINE SILICA and ZINC
Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical(s) known to the State of California to cause cancer.
DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
GB98

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SHERWIN WILLIAMS

LOWTEMP 35™

EXTERIOR LATEX SATIN

B17 SERIES

CHARACTERISTICS

LowTemp 35 Exterior Latex Satin is a quality product recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and primed metal down to a surface and air temperature of 35°F.

Color: Exterior ColorAnswers colors
Coverage: 350 - 400 sq ft/gal @ 4 mils wet; 1.3 mils dry
Drying Time @ 50% RH:
temperature and humidity dependent

	@ 35-45°F	@ 45-60°F
Touch:	2 hours	2 hours
Recoat:	48 hours	5 hours

Air and surface temperatures must not drop below 35°F for 48 hours after application.
Flash Point: 201°F, PMCC
Finish: 10-20 units @ 60°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy	4-8	100%

Vehicle Type: Acrylic

B17W410

VOC: 102 grams/liter; 0.85 lb/gal
Volume Solids: 35 ± 2%
Weight Solids: 47 ± 2%
Weight per Gallon: 10.3 lb

This product contains agents which inhibit the growth of mildew on the surface of this paint film.

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-19D

SPECIFICATIONS

Latex primers cannot be used below 50°F. See specific primer label for that product's application conditions.

Two topcoats are recommended for all surfaces.

Substrate	Primer
Aluminum[1]	no primer necessary
Block	Loxon Block Surfacer
Brick	Masonry Conditioner or ProMar Masonry Conditioner
Exterior Drywall	LowTemp 35 Exterior Latex Primer
Galvanized Steel[1]	no primer necessary
Masonry/Cement/Stucco	LowTemp 35 Exterior Latex Primer Loxon Ext. Acrylic Masonry Primer[2]
Plywood	LowTemp 35 Exterior Latex Primer
Preprimed Metal Siding[1]	DTM Bonding Primer[2]
Steel, alkyd primer[1]	All Surface Enamel Oil Primer
Steel, latex primer[1]	All Surface Enamel Latex Primer[2]
Vinyl Siding	no primer necessary
Wood, Composition Board	LowTemp 35 Exterior Latex Primer

[1] On large expanses of metal siding, the air, surface, and material temperatures must be 50°F or higher.
[2] Not for use at temperatures under 50°F.

SURFACE PREPARATION

When the air temperature is at 35°F, substrates may be colder; prior to painting, check to be sure the **air, surface, and material temperature** are above 35°F and at least 5°F above the dew point. Avoid using if rain or snow is expected within 2-3 hours.
Remove all surface contamination by washing with ProClean All Surface Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite Quick Seal or A-100 Exterior Oil Wood Primer.

Aluminum and Galvanized Steel—Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Brick—Allow brick to weather at least one year followed by wire brushing to remove all efflorescence.

Exterior Drywall—Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block—All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

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LowTemp 35™

Exterior Latex Satin

B17 Series

SURFACE PREPARATION

Preprimed Metal Siding—(Florocarbon, Silicone Polyester, and Polyester Polymers) Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Steel—Remove rust and mill scale using sandpaper, steel wool, or other abrading method. Remove all sanding dust. Prime bare steel the same day as cleaned.

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl Siding—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Remove all sanding dust.

Mildew—Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Do not apply at air or surface temperatures below 35°F or when air or surface temperatures may drop below 35°F within 48 hours.
No reduction necessary.
Brush
Use a nylon/polyester brush.
Roller
Use a 3/8" - 3/4" nap synthetic cover.
Spray—Airless
Pressure ..... 2000 psi
Tip ..... .015"-.019"

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

CAUTIONS

For exterior use only.
Protect from freezing.
Non-photochemically reactive.
Not for use on horizontal surfaces, such as a roof, deck, or floor, where water may collect.
On large expanses of prefinished metal siding, the air, surface, and material temperatures must be 50°F or higher.

LABEL CAUTIONS
CAUTION contains CRYSTALLINE SILICA and ZINC. Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Adequate ventilation required when sanding or abrading the dried film. If adequate ventilation cannot be provided wear an approved particulate respirator (NIOSH/MSHA TC21C or equivalent). Follow respirator manufacturer's directions for respirator use. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. DELAYED EFFECTS FROM LONG TERM OVEREXPOSURE. Abrading or sanding of the dry film may release crystalline silica which has been shown to cause lung damage and cancer under long term exposure. WARNING: This product contains a chemical known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
LCE 9/22/99
04 00

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.

SHERWIN WILLIAMS

LOWTEMP 35™

EXTERIOR LATEX FLAT

B15 SERIES

CHARACTERISTICS

LowTemp 35 Exterior Latex Flat is a quality product recommended for use on aluminum and vinyl siding, wood siding, clapboard, shakes, shingles, plywood, masonry, and primed metal down to a surface and air temperature of 35°F.

Color: Exterior ColorAnswers colors
Coverage: 350 - 400 sq ft/gal @4 mils wet; 1.5 mils dry
Drying Time @ 50% RH:
temperature and humidity dependent

	@ 35-45°F	@ 45-60°F
Touch:	2 hour	2 hours
Recoat:	24-48 hours	5 hours

Air and surface temperatures must not drop below 35°F for 48 hours after application.

Flash Point: 201°F, PMCC
Finish: 0-5 units @ 85°
Solvent/Reducer: Water
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Tinting White	0-4	100%
Base A, B, C	4-8	100%
Burgundy	4-8	100%

Vehicle Type: Acrylic
B15W210
VOC: 129 grams/liter; 1.08 lb/gal
Volume Solids: 40 ± 2%
Weight Solids: 57 ± 2%
Weight per Gallon: 11.7 lb

This product contains agents which inhibit the growth of mildew on the surface of this paint film.

Provides performance which is comparable to the products that are formulated in accordance with federal specification:
TT-P-19D
TT-E-2784A, Type III

SPECIFICATIONS

Latex primers cannot be used below 50°F. See specific primer label for that product's application conditions.

Two topcoats are recommended for all surfaces.

Substrate	Primer
Aluminum[1]	no primer necessary
Block	Loxon Block Surfacer
Brick	Masonry Conditioner or ProMar Masonry Conditioner
Exterior Drywall	LowTemp 35 Exterior Latex Primer
Galvanized Steel[1]	no primer necessary
Masonry/Cement/Stucco	LowTemp 35 Exterior Latex Primer or Loxon Ext. Acrylic Masonry Primer[2]
Plywood	LowTemp 35 Exterior Latex Primer
Preprimed Metal Siding[1]	DTM Bonding Primer[2]
Steel, alkyd primer[1]	All Surface Enamel Oil Primer
Steel, latex primer[1]	All Surface Enamel Latex Primer[2]
Vinyl Siding	no primer necessary
Wood, Composition Board	LowTemp 35 Exterior Latex Primer

[1] On large expanses of metal siding, the air, surface, and material temperatures must be 50°F or higher.
[2] Not for use at temperatures under 50°F.

SURFACE PREPARATION

When the air temperature is at 35°F, substrates may be colder; prior to painting, check to be sure the **air, surface, and material temperature** are above 35°F and at least 5°F above the dew point. Avoid using if rain or snow is expected within 2-3 hours.
Remove all surface contamination by washing with ProClean All Surface Cleaner or other appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with PrepRite Quick Seal or A-100 Exterior Oil Wood Primer.

Aluminum and Galvanized Steel—Wash with a water based degreasing cleaner to remove any oil, grease, or other surface contamination. All corrosion must be removed with sandpaper, steel wool, or other abrading method.

Brick—Allow brick to weather at least one year followed by wire brushing to remove all efflorescence.

Exterior Drywall—Fill cracks and holes with an exterior grade patching paste/spackle and sand smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block—All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Exterior Acrylic Masonry Primer.

continued on back

LowTemp 35™

Exterior Latex Flat

B15 Series

SURFACE PREPARATION

Preprimed Metal Siding—(Florocarbon, Silicone Polyester, and Polyester Polymers) Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Steel—Remove rust and mill scale using sandpaper, steel wool, or other abrading method. Remove all sanding dust. Prime bare steel the same day as cleaned.

Stucco—Remove any loose stucco, efflorescence, or laitance. Allow new stucco to cure at least 30 days before painting. If painting cannot wait 30 days, allow the surface to dry 5-7 days and prime with Loxon Exterior Acrylic Masonry Primer.

Vinyl Siding—Clean the surface thoroughly by scrubbing with warm, soapy water. Rinse thoroughly.

Wood, Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth. Remove all sanding dust.

Mildew—Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

Caulking—After cleaning the surface thoroughly, prime the surface, caulk, allow to dry, then topcoat.

APPLICATION

Do not apply at air or surface temperatures below 35°F or when air or surface temperatures may drop below 35°F within 48 hours.

No reduction necessary.

Brush

Use a nylon/polyester brush.

Roller

Use a 3/8" - 3/4" nap synthetic cover.

Spray—Airless

Pressure	2000 psi
Tip	.015"-.019"

CLEANUP INFORMATION

Clean spills and spatters immediately with soap and warm water. Clean hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.

LABEL ANALYSIS

B15W296

Pigment by Weight	37%
Titanium Dioxide	13%
Silicates	22%
Zinc Oxide	2%
Vehicle by Weight	63%
Acrylic Polymer	15%
Water	41%
Glycol/Esters	4%
Additives	3%
Total	100%

CAUTIONS

For exterior use only.

Protect from freezing.

Non-photochemically reactive.

Not for use on horizontal surfaces, such as a roof, deck, or floor, where water may collect.

On large expanses of prefinished metal siding, the air, surface, and material temperatures must be 50°F or higher.

LABEL CAUTIONS

CAUTION contains ZINC. Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH/MSHA TC23C or equivalent) or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately. WARNING: This product contains a chemical known to the State of California to cause cancer. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.

LCE 9/20/99

06 00

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Rust-Oleum Corporation
PO Box 581906 • Pleasant Prairie, WI 53158-0906 • 262-947-7220 • FAX 262-947-6855

RUST-OLEUM CORPORATION

Shipping Address:
8105 Fergusson Drive
Pleasant Prairie, WI 53158

March 31, 2000

Ms. Janette Brooks
Chief, Stationary Source Division
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812

Dear Janette:

Thank you for inviting me to provide a written record of my comments at the recent AIM SCM Workshop. I look forward to following up with you on these comments either on the afternoon of 4/11/00 or the morning of 4/12/00.

Comments made at 3/16/00 CARB AIM SCM Workshop and,
Comments on the Draft EIR and the documentary record supporting it.
By Duane DeYoung, Vice President of R&D, Rust-Oleum Corp. (draft 3/28/00)

As Vice President of R&D, and Technical Director for Coatings Development at Rust-Oleum, I bring extensive experience in Industrial Maintenance Coatings, including rust preventive brush and spray products, water based IM coatings, and high performance IM coatings. In addition, I have worked for years in the area of Trade Sales Architectural Coatings and in the area of water borne industrial finishes. With over 26 years of experience in coatings R&D, plus another 8 years of experience working in the chemical industries which supply materials to the coatings industry, I am well qualified to comment upon the technical issues contained in CARB's proposed Suggested Control Measure for Architectural Coatings. My comments below will concentrate on the IM category.

First, the singular VOC limit of 250g/L for the IM category is seriously flawed from a performance standpoint, because IM coating is NOT a monolithic, single use category, but spans a range from light duty IM uses to extremely heavy duty IM uses that address the requirements of protection in very specific industries and exposure situations. To expect that the needs of all IM areas can be met by one low limit is unrealistic.

10-1

What will be the predicted impacts on the varying segments of the IM category?

For Light Duty users and end uses, where non-professional, ad hoc painting of IM surfaces occurs on a routine basis, but where the substrates are forgiving, and the exposure conditions mild, the standard alkyd enamel coating tool will be lost, but can be replaced by water based latex IM enamels at < 250VOC. For these situations where low labor input, air drying and quick return to service issues are paramount, the impact will

-2

10-2 be to move from easy, low cost alkyd protection to slightly less easy, higher cost latex protection. Surface condition preparation will be more critical, and the temperature/humidity window for good application will be narrower, but the coating performance will be adequate.

10-3 Moderate Duty IM coatings users will suffer the biggest negative impact. These users are, again, usually non professional painters (not contractors) who are doing crucial regular maintenance of surfaces with more severe exposures to impact, abrasion, chemical contact, moisture, and temporary immersion. These surfaces represent the vast range of the industrial infrastructure of this country, ranging from production equipment, machines, tanks, reactors, decks and railings. These surfaces extend into the public service sector as well. In this area of the IM category, single component alkyd enamels reigned supreme in their ability to be substrate tolerant, easy to apply, and very protective in these moderate exposure conditions. For most of these uses the water based acrylic latex enamels will NOT be sufficient to protect this crucial infrastructure. These non-professional painters will need to turn to 2 component systems (epoxies and urethanes) which are inherently more difficult to handle and apply, and may not be suited to all of the surfaces that need protection. Consequently, the impact will be to move from a low cost solution to a complex, high cost coating. That coating will be more difficult to apply, will be easier to mis-apply, and will result in either MORE coating used to redo jobs, or LESS frequent painting and protection of these surfaces. Both results are counter- productive to these users. In addition, small uses of 2K coatings will result in more coatings waste as the unused portion of an activated coating cannot be saved and must be discarded.

10-4 The heavy duty IM area of the category is probably best served by existing 2K, 100% solids, plural component sprayed coatings systems that are applied by professional contractors using expensive, specialized spray equipment. Here the impact will be from high cost to HIGHER cost as VOC are ratcheted downward.

10-5 Second, the VOC limit of 250g/L for the IM category is flawed because many of the coatings presented as "effective, compliant" technology have been tested by various Public Service Agencies (Metropolitan Water District of Southern California, California DOT, County Sanitation Districts of LA County, California Department of Water Resources) and have been found to be deficient in the areas of durability and performance. These public utilities have been granted extensions in SCAQMD to find coatings that comply, thus indicating that there ARE serious doubts as to the "proof of concept" that compliant, EFFECTIVE coatings are ready to be used. This doubt is further exemplified by the extension of the IM limit enforcement from 7/1/2002 to 1/1/2004. Clearly CARB has seen this flaw in its own reasoning, otherwise it would not be acceding to the concerns of CA public utilities, nor would it be allowing industry an additional year to catch up the reality to the flawed expectation of readiness. The CARB response (comment #17-1) to essential public service providers that "Based on review, we conclude coatings... are available and that such complying coatings perform as well as higher VOC IM coatings" is simply untrue after my review of the

record. (See following section) such a CARB response demands detailed proof of validity, and I challenge CARB to do so.

Third, the CARB staff has NOT developed a factual, scientific record of actually tested, EFFECTIVE solutions to many of the IM needs. The NTS study did not adequately or scientifically compare long term protection/durability performance of high vs. low VOC coatings, choosing instead to rely on initially observable, but relatively insignificant properties of the few coatings tested.. Instead, the record shows that the staff has relied
10-6 on unproven product literature claims, RM supplier claims which are unsubstantiated, and overblown promotional product literature of questionable veracity. The record, as referenced below demonstrates a misunderstanding of REAL IM coatings and applications.

Examples of flawed records:

10-7 a. Referencing dubious products having weak claims, erroneous claims, and depending on marketing puffery to persuade unknowledgeable audience. Goes to lack of credibility.

10-8 Example IM p.152: Imprecise Salt Spray data; overblown rhetoric, erroneous claim of non-carcinogenic asphault based coating.

10-9 Example IM p.259: "VOC= 70 degree @ 60 degree angle".

-10 Example IM p.263: "waterborne moisture cure polyurethane coating" (chemically impossible.

10-11 b. Dependence on Supplier starting point formulae to demonstrate feasible technology. Such "starting point" formulae rarely, if ever, work. Nor do supplier claims of performance always come true when subjected to scientific verification. Such data sheets are NOT indicative of 'real' commercial technology, and cannot be relied upon to demonstrate that claim.
Examples: IM p. 182, 205, 206, 207, 208, 209,

c. Waterborne Coatings deficiencies

10-12 Acrylics: Need for primer over metal, immersion limitations
Example IM p. 183

10-13 2K Epoxies: Need for primer over steel and concrete; pot life; T/H limitations
Example: IM p.247

10-14 2K Urethanes: Pot life and shelf life limitations
Example IM p. 310, and RO personal experience with the technology limitations

10-15 Carcinogenic performance enhancers: aziridine as a cross-linker
Example: IM p. 198

10-16 d. Coatings limited to special use and/or specialized application equipment (i.e. coatings NOT for general purpose Lt. – Mod. Duty IM.)
Tank Linings using special spray equipment
Example IM p.203

10-17 Heat Cured linings requiring extended cure time at high temps.
Example IM p. 228, 230, 231, 232, 234, 240, 241, 243, 244, 245

e. Coatings requiring extremely specialized application equipment.
10-18 (i.e. NOT for GP IM use)
Plural component heated airless spray
Example: IM p. 251
Gel time of 5 seconds
10-19 Example: IM p. 297

f. Dependence on "technical" articles by suppliers. This begs the issue of conflict of
10-20 interest, and should not be depended on to "validate" technology that has not been tested thoroughly.
Example: IM p. 320-321

Suggestions for changes to the SCM:

10-21 1. Unify CARB's SCM with the coatings categories and limits used in the USEPA AIM Regulation.
2. Segregate IM into REAL use categories, and set limits based upon proven, fully
10-22 tested technology.
3. Consider IM category averaging to allow higher VOC's for Lt-Moderate duty
10-23 coatings, and lower VOC's for super High Performance specialty uses.
(i.e. 340 VOC alkyds for certain uses down to <100 VOC epoxies could net out at 250VOC for the category)

I shall be in Sacramento on April 11th an 12th of this month and would welcome the
10-24 opportunity to meet with you to expand on these comments. I also am requesting a response at that time which validates your conclusion #17-1 in the comment section. I believe that an appropriate validation would be for you to share the specific testing done by CARB to prove the worth of coatings which essential public services contends are not currently available. Please call me should you have any questions, and to schedule an appointment.

Sincerely,

Duane DeYoung
Vice President R&D

cc: Peter Venturini - CARB
Barbara Fry – CARB
Jim Nyardy – CARB
Bob Nelson – NPCA
Mike Murphy
Mike Tellor

Weak Claims
Erroneous Claims
Marketing Puffery

Filling the Void

Summary of Physical Properties

as tested by PRI, Asphalt Technologies Inc.

SHELF LIFE	Indefinite once properly covered/sealed.
DENSITY OF PRODUCT	4.1595 lb/gal.
SOLIDS CONTENT	77.9% (by wt.), 50% (by vol.).
FLASH POINT	188°F/86.67°C (ASTM D92 (COC)).
	201°F/93.89°C (ASTM D93 (Pensky Martens)).
BINDER CONTENT	80%.
SOLVENT	20%.
FINISH	Gloss/semi-gloss.
COLOUR	Can be pigmented to any colour.
COVERAGE	88 square feet per gallon.
DRYING TIME	Touch dry: 5 hours. Hard dry: 9 hours.
	Can be re-coated after 6 hours.
MIXING RATIO	3:1 base to catalyst (as supplied).
NUMBER OF COATS	One 8 mils coat.
APPLICATION	Brush or spray.
PRIMING	Standard epoxy primers if required.
POT LIFE	3 hours at ambient temperature.
SALT SPRAY	No deterioration of panels.
IMMERSION IN SOUR CRUDE	No penetration or loss of adhesion.
CLEAN UP	Vinegar immediately after use.
TEMPERATURE RESISTANCE HIGH	No change at 250°F/121°C.
TEMPERATURE RESISTANCE LOW	-22°F/-30°C.
COMBUSTIBILITY	Does not support a flame.

EP 150

Inventing the Future

Natural Rubberised ECO Coatings for the 21st Century

Man desires to step forward, but he stands on the brink of a void. As we take that giant leap into the twenty first century, new mandates and requirements assail us: products must do more., do it better, do it cost-effectively, and must now also do it safely as the plant itself is at stake.

But what are the options?

Let us take a look at our present situation.

There are also vinyl, alkyd and epoxy based coatings which are unsatisfactory as they require harmful anti-fouling agents when used in a marine environment; and a handful of eco-friendly coatings which are unsatisfactory because their physical properties are inferior.

Dolly Nicholas – Asphalt Products Trinidad Limited

But what is the solution?

To fill the void created by these unsatisfactory coatings. Asphalt Products Trinidad Limited (APTL) has researched and developed the only natural, rubberised, non-carcinogenic, eco-friendly coatings in the world which are now patented and commercially available under the Sure Coat ® brand name.

In particular, Sure Coat ® Epoxigard, is a superior coating whose physical properties have been independently tested and found to be outstanding by PRI Asphalt Technologies Incorporated of Tampa, Florida.

Sure Coat ® Epoxigard has passed California's SCAQMD Rules 1106 for marine coatings and Rules 1113 for industrial coatings.

Sure Coat ® Epoxigard has been tested for Volatile Organic Content (VOC) using California's Environmental Protection Agency (EPA) method #24 and found to be 257g/l, which is far below the EPA acceptable level of 450g/l.

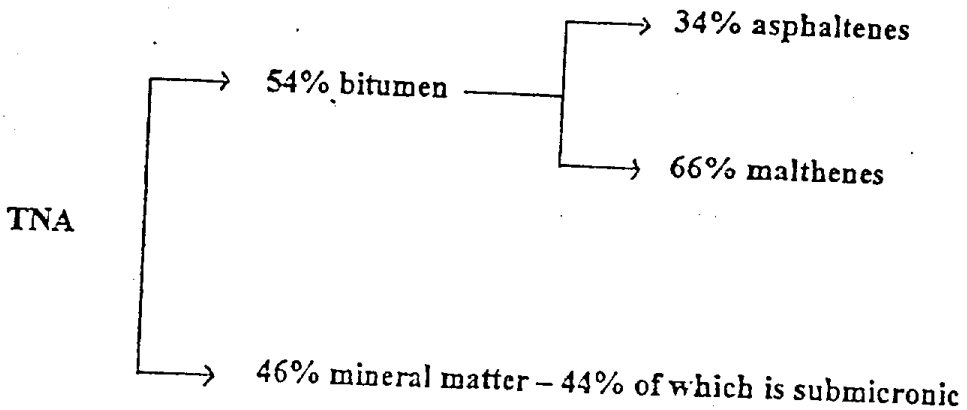
And right now, it is also being tested to an ASTM standard for use in potable water systems.

Ex 15

But what make Sure Coat ® Epoxigard so distinct and superior to other coatings available worldwide?

First, Sure Coat ® Epoxigard has been developed using naturally rubberised Trinidad Natural Asphalt (TNA or Epure) which is 100% solids and divided into a bitumen and asphalt fraction.

Trinidad Natural Asphalt or TNA has superior properties even in its refined natural state and can be shown as follows:



Em 15j

The 54% bitumen in TNA is composed of asphaltenes and malthenes. Asphaltenes are responsible for the hardness of any bitumen, while malthenes are responsible for its sticky, resinous nature.

Asphalts are used as protective films because they are waterproof and weather-resistant. Some movement can occur without fracture because of their viscous (sol) nature. They give continuous, satisfactory service because of their slow rate of hardening from heat, oxidation, fatigue and weathering. Expose asphalt films harden partially from a loss of volatile oils and to a greater extend from the formation of additional asphaltene fractions and the loss of the sticky, resinous malthenes; i.e..,

Oil (asphaltic —**uv light**→ **goes off**

Malthenes —**uv light / Blowing (oxygen)**→ **asphaltenes**

The oxidation, which is undoubtedly catalysed by ultra violet radiation, forms water-soluble degradation products which are removed from the asphalt film. The film then show typical crack patterns because of

EM #5

insufficient plasticising by the 'sticky' malthenes remaining in the continuous phase. However, there is no loss of durability as the pick up of water is a surface manifestation. The film softens and forms blisters but there is only minimal loss of bond to surfaces even with continued immersion in water. The film will continue to protect metals from corrosion for extremely long periods of time.

The addition of a softer material would allow for a longer weathering life before the malthene-asphaltene composition becomes critical and the coating fails. Yet one cannot assume that the softest material, the one with the highest malthene:asphaltene ratio, would necessarily be the most desirable. For example, while a bitumen of penetration grade 180/200 may be extremely soft as it has a high malthene:asphaltene ration, it cannot be used as a coating as is, simply because it will not dry.

It is therefore desirable to START with the ratio of malthenes:asphaltenes as high as possible to obtain a longer lifespan from a coating.

7/6/89

Second, Sure Coat & Epoxigard has a very high solids content

Mineral fillers are usually added to asphalts to minimise the creation of voids due to evaporation and to increase the hardness of the dried or cured film. However, while these mineral fillers are opaque and offer added protection against weathering, they sometimes increase the water absorption of the asphalts.

By contrast, the high percentage of mineral matter in TNA consists largely of quartz in the form of sharp flakes and clay; Titanium dioxide accounts for 12.5% of TNA's mineral matter; and 44% of the total mineral matter is submicronic in particle size (much less than 10 um) which means that it never settles remaining instead in suspension and making TNA homogenous in nature;

Therefore, for a coating to be superior,

(1) the starting bitumen must have the highest possible malthene:asphaltene ratio;

(2) any incorporated mineral matter should have a low water absorption; and

JM 15

(3) the solids content should be high and the particle size of the mineral matter should be extremely small reducing to a minimum the voids caused by evaporation during drying, and for improved hardness.

Refined TNA, the base product of Sure Coat ® Epoxigard, possesses all the above qualities which are necessary to give a coating superior properties.

Neither a blown (oxidised) bitumen with improved hardness but decreased adhesiveness, nor gilsonite or other natually occurring asphalts have TNA's colloidal mineral filler.

However, neither blown refinery bitumen nor naturally occurring gilsonite have the colloidal mineral filler as compared to what is present in TLA. For as Dr. Tada stated, the mineral matter looks like a honeycomb structure filled with polygonal plantlike materials of several microns and their coagulation's. Due to the shape of this mineral matter there is a larger surface area for contact with the bitumen as opposed to simple round particles. This finding (honeycomb effect) led Dr. Tada to conclude that

'the honeycomb structure of the mineral matter accounts for the secret in the unique properties of Trinidad Lake Asphalt'. Ref.1

The advantages of TNA as the starting bitumen are therefore:

(1) a naturally occurring high malthene:asphaltene ratio;

(2) a naturally occurring colloidal mineral filler of which 44% is less than 10 um in particle size

(3) a naturally occurring mineral structure which allows for greater contact due to its small particle sizes

Third, the above qualities of TNA have not only been better combined and improved upon in Sure Coat ® Epoxigard, but Sure Coat ® Epoxigard is also naturally rubberised

This make Sure Coat ® Epoxigard:

more elastic,

more flexible,

more 'spreadable' (better coverage),

Im #6

more able to resist movement due to quakes, transportation and more able to resist cracking due to expansion of coated surfaces.

And fourth, Sure Coat ® Epoxigard is 100% eco-friendly.

Advantages of a Sure Coat® Epoxigard Coating

1) A non-carcinogenic coating
2) A low VOC coating
3) A thick coat (8 mil DFT) with no cracks
4) A rubberised natural asphalt coating which is flexible but tough
5) Clean-up requires no special solvents – use vinegar
6) A coating which utilises the latest silica – coupling agent (siloxane) Technology
7) A coating that can be undercoated or overcoated

Where presently used?

In the Caribbean: ~ Ship's hulls (under the water line) fibreglass, wood, Steel

-- animal farms where the pH is extremely high due to urea content; highly corrosive environment

~ tank farms

California: ~ hulls of aluminium boats "without primer"

Best used in the following environments:

- **oil industry e.g. pipelines (on land and submerged), storage tanks etc.**
- **cargo and ballast tanks**
- **pillings, bilges, bouys**
- **ships (above and below waterline), pleasure crafts, etc.**
- **industrial plant equipment**
- **bridges**
- **sewer tanks/plants/waste management**
- **splash zones/spillage areas**
- **and a number of "harsh environmental" uses**

IM 162

Note, this list is not exhaustive and if you require further information on a particular usage or for any additional enquiries, please feel free to contact:

Mrs. Dolly Nicholas or Dr. Anand Mungalsingh
ASPHALT PRODUCTS TRINIDAD LIMITED
Building #3, Demerara Drive
I.D.C. Compound
Point Lisas
TRINIDAD, W.I.

Telephone : 1 809 679 4052
Telefax : 1 809 636 3554
e-mail : ASPHALT@ WOW.NET

Ref.1: Dr. H. Tada (1985): A Story about Trinidad Lake Asphalt, Doro Kensetu (Road Construction) Number 452 September 1985.

Coatings Resource Corporation

Cranway Clean (Credibility

Technical Data

SOLVENTLESS HIGH BUILD SURFACE TOLERANT EPOXY

CR - 35

INDUSTRIAL COATINGS

Description

CR-35 is a high build surface tolerant epoxy designed for non-immersion concrete and carbon steel surfaces. CR-35 offers low temperature cure, is 0-VOC and conforms to Title 21 CFR 175,300 USDA requirements and is applied with airless or conventional spray methods.

Environment

CR -35 is applied as a corrosion resistant product available in colors and is specified as a protective coating subject to splash, spillage, and chemical fumes as associated with the petrochemical, water & water-waste, mining & milling food processing, pulp & paper, and other selected industries. See chemical resistance guideline for specific environments.

Physical Characteristics

Type:	Amine Cured Epoxy.
Mix Ratio:	Premeasured 1 gal. & 5 gal. kits
Vol. Solids:	100%
Pot Life:	¾ Hour @72°F.(1-gal. mixed)
Thinner:	Acetone .
Density:	12.0 #/Gal
Substrates:	Prepared Carbon Steel or Prepared Concrete/Masonry
Colors:	Off-White and tint bases. This product will yellow slightly in UV and oxidize.
Gloss:	70 degree @ 60 degree angle
VOC G/L:	0
DFT/Mils:	2-10
Recoat:	4-76 hours Depending on temp. and Humidity. Application Temperature Between 20°F-125°F., 0-95% Relative Humidity.
Flashpoint:	Non-Flammable
Dwell Time:	1 hour @20°F. 45 min. @40°F. 30 min. @60°F. 20 min. @80°F. 5 min. @100°F.
Primer:	Self Priming or CR-42, CR-44, CR-49

Application

Surface Preparation:

Remove all oil, grease, sludge, and other contaminants from surface prior to abrasive blasting. Carbon Steel - Prepare surface to accordance to SSPC-SP6 (commercial blast cleanliness) and achieve a 2-3 mil surface profile. Remove all weld spatter and welding residue and all sharp edges. Welds must be ground smooth.

Concrete - Scrape or grind fins and protrusions flush with the surface. Remove surface laitance and protrusions by abrasive blasting in accordance with SSPC-SP7 (brush-off blast cleaning) or Blas-Trac Method in effort to provide an anchor profile. Cr-35 is a prime/finish or can be utilized as a prime coat for other CR topcoats.

Mixing and Thinning:

Mix base component until a homogeneous mixture and color is obtained. Next, mix both components as is needed within the pot life of mixed material. Use air driven power or jiffy mixers. Add sufficient aggregate to mixed material as needed for application.

Application: Use Graco "Hydra-Cat" 45:1 Airless equipment or equal designed for spraying high solids coatings. Use Binks "Airless 1" spray gun with Reverse-A-Clean .021-.023 spray tips, 3/8" or larger solvent resistant fluid line with 1/4 " or larger air supply line. Adjust pump to the lowest possible setting that allows proper atomization.

For conventional spray application, use galvanized or other alloy metal pressure tanks with dual regulation and standard duty agitation. Binks "2001" spray gun, #66 fluid nozzle,#66SD air cap, #565 fluid needle, teflon fluid packing, lowest possible setting that allows proper atomization.

5582 McFadden Avenue ◇ Huntington Beach ◇ CA 92649
(714) 894-5252 ◇ FAX (714) 893-2322

JM 25

Erroneous Claim
Credibility

Coatings Resource Corporation

Technical Data

HIGH SOLIDS WATERBORNE URETHANE

CR-38

INDUSTRIAL COATINGS

Description

CR-38 is a very chemical resistant 0 VOC waterborne moisture cure polyurethane coating. This class product is designed as a protective primer/ finish over marginally prepared carbon and alloy steel under adverse weather conditions and is very user friendly.

Environment:

CR-38 is applied as a primer/ finish for steel tanks, piping, marine exposure, fiberglass, equipment and other substrates for moderate to severe atmospheric conditions that require ease of application and quick dry properties. This class product offers outstanding adhesion, low and high humidity cure, and can be utilized with various CR Industrial Primers.

Surface Preparation:

Remove all oil, grease, sludge, and other contaminants from surface prior to abrasive blasting steel. Prepare steel surface in accordance with SSPC-SP6. Abrasive 'Brush Off' Blast cured concrete surfaces in accordance with SSPC-SP7 Prepare intact coatings in accordance with SSPC-SP1 or SSPC-SP7. Check wood surfaces to insure dry, mildew free conditions exist.

Physical Characteristics

Type:	Acrylic Polyurethane
Mix Ratio:	3 parts B to 2 parts A by volume
Vol. Solids:	80%
Pot Life:	2 hours @ 70° F
Thinner:	Add 5-15% depending on application.
Density:	11.5 lb/gal
Substrates:	Prepared Steel, Concrete, Masonry, Fiberglass, Sheetrock, Wood.
Colors:	Various Tint Bases
Gloss:	Available in high,medium & low gloss.
VOC G/L:	0
DFT/ Mils:	1-3
Application:	Application temperature between 45-110°F & 10%-95% relative humidity.
Recoat:	2-48 hours @ 75° F
Primers:	Self Priming or CR-34, CR-42, CR-44, CR-49
Flashpoint:	Non-Flammable
Dwell Time:	15 minutes @40°F. 10 minutes @50-60°f. 5 minutes @60-80°F. 2 minutes @80-100°F. DO NOT REDUCE UNTIL DWELL TIME IS ACHIEVED.

Mixing and Thinning:

Mix base component until a homogeneous mixture and color is obtained. Next, pour activator slowly into base component while under slow agitation (less than 500 rpm with mechanical drill or mixer). Stirring with spatula or stir-stick is acceptable. Mix both components for approximately 2-3 minutes. High shear mixing is not recommended. After dwell time is achieved, reduce with clean fresh potable water, adding very slowly and mixing for 1-2 minutes. Typically, reduce with water no more than 5% when utilizing heavy duty airless equipment, 5%-10% for conventional spray, 5%-15% for brush and roll application. Adding water increases pot life by 30-minutes to 1 hour depending on temperature.

Application: Conventional – Use galvanized or other alloy metal pressure tanks with dual regulation and standard duty agitation, Binks "2001" spray gun, #66 fluid nozzle, #66SD air cap, #565 fluid needle, teflon fluid packaging, 3/8" or larger solvent resistant fluid line and ¼" or larger air supply line. Adjust air and material pressure to the lowest possible setting that allows proper atomization.

Airless Spray- Use Graco 33:1 Airless equipment or equal designed for spraying high solids coatings. Use Binks 'Airless 1' Spray gun with Reverse-A-Clean 0.017-0.019 spray tips, 3/8" or larger solvent resistant fluid line with ¼" or larger air supply line. Adjust pump pressure to the lowest possible setting that allows proper atomization.

Brush and Roller: Use solvent resistant mohair or other natural brushes with feather edge. Roller shall be solvent resistant phenolic core with nap sheepskin or other natural roller.

For further technical information contact your Coatings Resource Representative

5582 McFadden Avenue ◆ Huntington Beach ◆ CA 92649
(714) 894-5252 ◆ FAX (714) 893-2322

Exh 263

Supplier Starting Point

MorKote™ 1035 Acrylic Emulsion

INDUSTRIAL COATINGS

Description

MorKote 1035 is a very low temperature film forming acrylic copolymer emulsion for low VOC applications. It offers excellent flexibility, adhesion and high gloss capabilities. MorKote 1035 is recommended for exceptional tannin stain blocking and "bleed through" resistance over redwood. This emulsion offers good tannin block properties with stain inhibitive additives without the incorporation of zinc oxide.

Typical Properties*

Appearance	Translucent
Total Solids, % Weight	48
Glass Transition Temperature (Tg °C)	-42
Min. Film Formation Temperature (MFFT °C)	<5
Brookfield Viscosity (cps)	1500
Acid Number	45
pH	8.0
Density (lbs./gallon)	8.6
Freeze/Thaw Stable	Yes
Pigment Grind Vehicle	Yes

**Typical properties are not intended to be product specifications.*

Features

- High Gloss Capabilities
- Excellent Flexibility
- Tannin Block Resistance Without Zinc Oxide
- Good Flow and Leveling
- Very Low VOC Capabilities

Industrial Applications

- Tannin Block Primer
- Modifier for Low VOC Applications

Formulation Recommendations

Coalescent Solvents

MorKote 1035 is compatible with a wide variety of coalescent solvents. The recommended coalescent solvent level is 0% to 10% based on resin solids. MorKote 1035 acrylic emulsion exhibits good compatibility with:

Diethylene Glycol Monobutyl Ether (DB)
Diethylene Glycol Monoethyl Ether (DE)
Diethylene Glycol Monomethyl Ether (DM)
Diethylene Glycol Monoethyl Ether (DP)
Dipropylene Glycol Methyl Ether* (DPM)
Ethylene Glycol Monobutyl Ether (EB)
Propylene Glycol
Texanol®

**Pre-dilute with water 50/50 to prevent shock to the emulsion.*

Defoamers

Defoamers are an important additive to a paint formulation. Ease of incorporation is a key criteria for defoamer selection. Defoamers are effective when they are insoluble in the medium to be defoamed and when they display a certain degree of selective incompatibility. As a result, the following side effects should be considered: 1) Gloss Decrease, 2) Haziness in Clear Systems, 3) Tendency toward Crater Formation and 4) Possible Influence on Intercoat Adhesion. Since individual defoamer products behave differently in regard to potential side effects, the formulator must be sure to consider these variables when making defoamer selection. Defoamers should be screened at various levels to reach the proper balance between desired defoaming action and undesired side effects. Henkel Foamaster® VL is an effective defoamer for MorKote™ 1035.

In addition, Ultra Additives has three foam control agents that are effective with MorKote 1035. DEE FO® PI-35 is an effective silicone defoamer that can be used at 0.2% based on total formula weight. DEE FO PI-12 is a mineral oil based defoamer with excellent persistence and shear stability that can be used at 0.5% based on total formula weight. DEE FO 3010E/50 is an organically bound defoamer with excellent long-term stability, shear stability and substrate wetting that can be used at 0.5% based on total formula weight. These foam control agents were tested with neat MorKote 1035 using the Red Devil Shaker Test (Test Method UAI-130) and heat age stability study.

Stain Inhibitive Additives

MorKote 1035 exhibited excellent tannin block resistance on redwood with Wayne Pigments Corporation Stainban® 185, an aqueous stain inhibitive additive. Stainban® 185 was added at a level of 2.5% active inhibitor on resin solids. The formulator does not need to incorporate zinc oxide that can cause in-can stability problems. In addition, MorKote 1035 showed good tannin block resistance with Halox Pigments XTAIN® A at loading 15 pounds per 100 gallons when formulated at 20% and 40% PVC levels. Zinc oxide does not need to be used in the tannin block primer.

Zn 182

Supplier Starting Point

HIGH GLOSS WHITE TOPCOAT
MorKote™ 1001 Acrylic Emulsion
Formula 803-15

Material	Quantity Pounds	Quantity Gallons	Description
Grind:			
Butyl Cellosolve	39.00	5.20	Coalescent Solvent
Water	46.00	5.50	Carrier
Proxel® GXL	0.20	0.02	Preservative
Tamol® 681	10.60	1.16	Dispersant
Triton® GR-7M	2.40	0.30	Surfactant
DEE FO® HG-12	2.00	0.30	Defoamer
Ti-Pure® R-902	200.00	6.00	Titanium Dioxide
Grind at high speed for 6+ Hegman, then add:			
Letdown:			
MorKote™ 1001	679.00	79.00	Acrylic Emulsion
Ammonium Hydroxide, 28%	1.50	0.20	Buffer
Texanol®	13.00	1.65	Coalescent Solvent
SM 2169	0.80	0.12	Mar/Slip Additive
Flash X-150	7.00	0.72	Flash Rust Inhibitor
DEE FO® HG-12	2.00	0.26	Defoamer
Add the following, adjust for final viscosity:			
Acrysol® RM-2020	11.50	1.34	Associative Thickener
Total	**1015.00**	**101.77**	

Formulation Properties

Physical Properties	
% Solids by Weight	50.3
% Solids by Volume	40.0
% PVC	14.8
Pigment/Binder Ratio	0.64
VOC (grams/liter)	135

Specification Properties	
Viscosity (KU)	82
ICI Viscosity (poise)	1.4
Density (lbs./gallon)	9.97
pH	8.0
Initial Gloss (60°/20°)	82/49
Sag Resistance (mils)	10

Dry Times (ASTM D-1640):	
Dry to Touch (minutes)	15
Tack-Free (minutes)	30
Recoat (minutes)	70

Ambient Stability	Passes
Oven Stability (30 days@120°F)	Passes
Freeze/Thaw	Passes 5 cycles

Performance Properties

Adhesion (ASTM D3359-78)

Metals	
Cold Roll Steel	Excellent
Bonderite 1000	Excellent
Galvanized	Good
Aluminum	Poor
Plastics	
Acrylic Sheet	Excellent
Polycarbonate (Lexan LS2-111)	Excellent
Polypropylene	Good
PVC	Poor

Chemical Resistance (ASTM D1308-87)

Reagents	*1 hour Spot Test*
25% Sodium Hydroxide	No Effect
50% Sodium Hydroxide	No Effect
10% Phosphoric Acid	No Effect
25% Phosphoric Acid	No Effect
10% Sulfuric Acid	No Effect
25% Sulfuric Acid	No Effect
15% Nitric Acid	No Effect
Water	No Effect

Wet Adhesion Scrub Test	
Glossed Alkyd	Passed, 1000 cycles
Scrub Resistance	
(Modified ASTM D2486-Q5)	Passed, 1000 cycles
Blister Resistance (ASTM D714)	
1 hour soak	10
Pencil Hardness (ASTM D3363)	
7 days cure	HB
Block Resistance (ASTM D4946)	
Ambient, 1 hour @ 3 psi, 7 day cure	10 (excellent)
120°F, 1 hour @ 3 psi, 7 day cure	7 (good to very good)

JM2-01

Raw Material Suppliers

Supplier	*Raw Material*	*Phone Number*
Eastman Chemical	Coalescent Solvents, Texanol® & EB	(800) EAS-TMAN
E.I. Dupont	Titanium Dioxide, Ti-Pure® R-902	(800) 441-9485
GE Silicones	Mar/Slip Additive, SM 2169	(800) 255-8886
Halox Pigments	Flash Rust Inhibitor, Flash X-150	(219) 933-1560
Morton International, Inc.	Acrylic Emulsion, MorKote™ 1001	(800) FOR-RESN
Rohm & Haas Company	Associative Thickener, Acrysol® RM-2020	(215) 592-3000
Rohm & Haas Company	Dispersant, Tamol® 681	(215) 592-3000
Ultra Additives	Defoamer, DEE FO® HG-12	(800) 524-0055
Union Carbide	Surfactant, Triton® GR-7M	(800) 752-1827
Zeneca	Preservative, Proxel® GXL	(800) 523-7391

If you would like additional information write, fax or call Morton International at the following worldwide locations:

Morton International, Inc.
Waterbased Polymers—CANADA
430 Finley Avenue
Ajax, Ontario, Canada LIS 2E3
General Number: 905-683-2071
Facsimile Number: 905-683-7272

Morton International S.A. De C.V.
Waterbased Polymers—MEXICO
Calle 6 Norte No. 100
Esquina Ese 1 Norte
Ampliacion Parque Industrial Toluca 2000
50200 Toluca, Estado de Mexico
General Number: 52-72-79-0082
Facsimile Number: 52-72-79-0212

Morton International, Inc.
Waterbased Polymers—FRANCE
Le Pressoir Vert
45400 Fleury les Aubrais
Semoy, France
General Number: 33-238-618100
Facsimile Number: 33-238-618132

Morton International Produtos Quimicos Ltda.
Waterbased Polymers—BRAZIL
Rua Cincinato Braga 59
2° - Conj "C-1" CEP 01333
Sao Paulo, Brazil
General Number: 55-11-287-6154
Facsimile Number: 55-11-288-3602

Morton International GmbH
Waterbased Polymers—GERMANY
Beim Struckenberge 11
D-28239 Bremen, Germany
P.O. Box 210254
D-28222 Bremen, Germany
General Number: 49-421-64980
Facsimile Number: 49-421-6498103

Morton International Limited
Waterbased Polymers—UNITED KINGDOM
Westward House
115-157 Staines road
Hounslow, Middlesex TW3 3JB
General Number: 44-181-570-7766
Facsimile Number: 44-181-572-5516

Morton International Pte. Limited
Waterbased Polymers—PACIFIC REGION
135 Pioneer Road
Singapore 639589
General Number: 65-861-0822
Facsimile Number: 65-861-9534

Responsible Care®

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Revision: 9/93

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Morton

Morton International, Inc. Waterbased Polymers 100 North Riverside Plaza Chicago IL 60606-1593
Phone 312/807-2000 Fax: 312/807-3435 Customer Service: 800/521-2247 Technical Assistance: 800/FOR-RESN
Website: www.morton.com

I In 206

Supplier Starting Point

HAPS FREE HIGH GLOSS TOPCOAT
MorKote™ 1400 Acrylic Emulsion
Formula 790-1930 B

Material	Quantity Pounds	Quantity Gallons	Description
Grind:			
MorKote™ 1400	250.0	28.51	Acrylic Emulsion
Surfynol® CT-131	2.9	0.33	Dispersant
BYK®-022	1.0	0.12	Defoamer
Ti-Pure® R-706	196.0	5.62	Titanium Dioxide
Grind to Hegman 7 or better, then add:			
Letdown:			
MorKote™ 1400	445.0	50.74	Acrylic Emulsion
BYK®-024	2.0	0.24	Defoamer
Water	10.65	1.28	Carrier
Propylene Glycol	43.0	4.98	Coalescent Solvent
Dowanol® DPM	11.0	1.39	Coalescent Solvent
Texanol®	40.0	5.06	Coalescent Solvent
BYK®-346	5.0	0.60	Wetting Agent
Flash X-150	5.0	0.54	Flash Rust Inhibitor
Hold thickener for final viscosity adjustment			
Tafigel™ PUR 50	5.0	0.59	Associative Thickener
Totals	1016.55	100.00	

Formulation Properties

Physical Properties	
% Solids by Weight	51.8
% Solids by Volume	42.0
% PVC	13.7
VOC (grams/liter)	205
Specification Properties	
Viscosity (KU)	86
ICI Viscosity (poise)	1.2
Density (lbs./gallon)	10.1
pH	8.2
Initial Gloss (60° / 20°)	91/55
Sag Resistance (mils)	7
Dry Times (ASTM D-1640)	
Dry to Touch (minutes)	30
Tack-Free (minutes)	60
Recoat (minutes)	120
Freeze/Thaw	Passes 5 Cycles
Ambient Stability (30 days)	Passes
Oven Stability (30 days @ 50°F)	Passes

Performance Properties

Adhesion (ASTM D3359-78)	
Aluminum	Good
Bonderite 1000	Excellent
Cold Rolled Steel	Excellent
Chemical Resistance (ASTM D1308-87)	
Deionized Water	No Effect
25% Sodium Hydroxide	Ring
25% Phosphoric Acid	No Effect
25% Sulfuric Acid	No Effect
Propylene Glycol	Slight Ring
Blister Resistance (ASTM D714)	
1 hour soak	10
24 hour soak	10
Block Resistance (ASTM D4946)	
Ambient, 24 hours, 7 days cure	10
120°F, 1 hour, 7 days cure	9
Pencil Hardness (ASTM D3363)	
7 days cure	3B

Ex No. 307

Keystone

HAPS FREE GENERAL INDUSTRIAL TOPCOAT
MorKote™ 1725 Acrylic Emulsion
Formula 997-23

Material	Quantity Pounds	Quantity Gallons	Description
Grind:			
MorKote™ 1725	55.90	6.50	Acrylic Emulsion
Water	16.66	2.00	Carrier
Surfynol® CT-136	3.00	0.34	Disperant
BYK®-024	2.00	0.24	Defoamer
Ti-Pure® R-706	200.00	6.00	Titanium Dioxide
Grind at high speed to 6 to 6.5 Hegman, then add:			
Letdown:			
Water	73.39	8.81	Carrier
Add slowly, then mix for 10 minutes			
MorKote™ 1725	589.10	68.50	Acrylic Emulsion
Add and mix for 15 minutes			
DPnB	45.30	6.00	Coalescent Solvent
Add and mix for 15 minutes			
BYK®-024	3.00	0.36	Defoamer
BYK® 307	2.00	0.23	Surface Tension Modifier
Mix for 20 minutes			
Flash X-150	10.00	1.02	Flash Rust Inhibitor
Totals	**1000.35**	**100.00**	

Formulation Properties

Physical Properties

% Solids by Weight	51.9
% Solids by Volume	41.5
% PVC	14.5
VOC (grams/liter)	114

Specification Properties

Viscosity (KU)	83
ICI Viscosity (poise)	1.2
Density (lbs./gallon)	10.0
pH	8.7
Initial Gloss (60° / 20°)	84/50
Sag Resistance (mils)	16

Dry Times (3 mils wet, 35%-40% R.H. @ 70-75°F)

Dry to Touch (minutes)	15
Tack-Free (minutes)	45
Recoat (minutes)	60
Oven Stability (30 days @ 120°F)	Passed

Performance Properties

Adhesion (ASTM D3359-78)

Bonderite 1000	Excellent
Cold Rolled Steel	Excellent
Galvenized	Excellent
Pencil Hardness (ASTM D3363-92A)	F

Chemical Resistance (ASTM D1308-87)

Water	No Effect
25% Sodium Hydroxide	No Effect
50% Sodium Hydroxide	Blushed, Dull Film
10% Phosphoric Acid	No Effect
25% Phosphoric Acid	No Effect
10% Sulfuric Acid	No Effect
25% Sulfuric Acid	No Effect
25% Nitric Acid	Dull Film, Slightly Soft Film

EM20

Supplier.

INTERIOR SATIN STAIN RESISTANT COATING
MorKote™ 1043 Acrylic Emulsion
Formula 997-21

Material	Quantity Pounds	Quantity Gallons	Description
Grind:			
Water	54.10	6.50	Carrier
Proxel® GXL	1.50	0.16	Preservative
Surfynol® CT-324	3.00	0.34	Dispersant
Tergitol® NP-9	3.00	0.35	Surfactant
Drew® L-475	2.00	0.26	Defoamer
Ti-Pure® R-706	200.00	6.50	Titanium Dioxide
Min-u-sil® 30	90.00	4.07	Flattener
Grind to 5+ Hegman			
Letdown:			
Water	242.07	29.06	Carrier
Propylene Glycol	30.80	4.00	Coalescent Solvent
Sift in slowly			
Natrasol® Plus	2.00	0.18	Cellulosic Thickener
Mix 5 minutes			
Ammonium Hydroxide, 28%	2.00	0.27	Buffer
Mix 30 minutes			
MorKote™ 1043	396.00	45.00	Acrylic Emulsion
Mix 10 minutes			
Arysol® RM-8W	13.00	1.44	Associative Thickener
Mix 15 minutes			
Aersol® OT-75	1.00	0.10	Wetting Agent
BYK® 307	1.50	0.18	Slip/Mar Additive
Mix 10 minutes			
Texanol®	11.85	1.50	Coalescent Solvent
Drew® L-475	3.00	0.39	Defoamer
Mix 10 minutes			
Hold for Viscosity adjustment			
Acrysol® RM-8W	3.00	0.33	Associative Thickener
Totals	1058.82	100.00	

Formulation Properties

Physical Properties	
% Solids by Weight	47.8
% Solids by Volume	35.8
% PVC	28.6
VOC (grams/liter)	129.4
Specification Properties	
Viscosity (KU)	90
ICI Viscosity (poise)	1.3
Density (lbs./gallon)	10.59
pH	9.2
Initial Gloss (60°)	16
Sheen (85°)	22
Sag Resistance (mils)	12
Dry Times (3 mils wet, 35%-40% RH @ 70-75°F)	
Dry to Touch (minutes)	15
Tack-Free (minutes)	30
Recoat (minutes)	120
Freeze Thaw	Passed 5 Cycles
Oven Stability (30 days @ 120°F)	Passed

Performance Properties

Wet Adhesion Scrub Test Gloss Alkyd	Passed, 1000+ Cycles
Scrub Resistance (Modified ASTM D2486-Q6)	Passed, 1000+ Cycles
Stain Removal Properties	Excellent

I 117 209

Waterborne Coatings Limitations

Amercoat® 220
Waterborne acrylic

Product Data

- Self-priming
- VOC-compliant
- Single-package convenience
- Gloss or satin
- Brush, roll or spray
- Dries fast, minimum downtime
- Interior for OEM
- Excellent gloss retention and weathering
- Superior impact resistance and flexibility
- Washable, scrub-resistant
- Durable, chemical-resistant
- Stain resistant
- Quick, easy clean up
- Wide color range

WOT wood ...

Amercoat 220 is a high-performance waterborne acrylic enamel that may be applied direct* to metal on most exterior and interior surfaces. Also ideal for concrete and masonry, it may be used over tightly adhering old paint and rust as well as primed surfaces. Amercoat 220 provides a beautiful, flexible, cleanable gloss finish that resists cracking, peeling and impact damage. Amercoat 220 significantly out-performs conventional acrylic coatings. It retains color and gloss like a polyurethane, far better than traditional alkyds.

Amercoat 220 requires minimal surface preparation, usually only metal etching or power tool cleaning to remove loose rust. Easy to apply and clean up, Amercoat 220 is a versatile topcoat for a wide variety of new construction and maintenance application. Contact your Ameron representative for conditions outside the requirements or limitations described.
Important – Amercoat 220 deep or dark colors made from neutral or clear tint base should always be used with a prime coat when going over metallic surfaces such as steel and aluminum.

Typical Uses

- Walls
- Food processing plants
- Institutional maintenance and new construction
  Schools
  Hospitals
  Laboratories
  Storage areas
- Industrial maintenance and new construction
  Tank exteriors
  Structural steel
- Marine applications
  Vessel topsides and interiors
  Offshore platform topsides and interiors

Not recommended for continuous immersion

Physical Data

Finish	Gloss
Color	See color chart

Uniform appearance will require two coats of white or pastel colors over dark substrates. Use only light-colored primer or intermediate coat when one finish coat of white or pastel Amercoat 220 is specified. Gloss varies with color.

Components	1
Curing mechanism	Drying
Volume solids (calculated)	35% ± 3%
Dry film thickness per coat direct-to-metal	2 mils (50 microns) 2-5 mils (50-125 microns)

Coating thickness depends on severity of exposure and surface roughness.

Coats	1 to 2	
Theoretical coverage	ft²/gal	m²/L
1 mil (25 microns)	561	13.8
2 mils (50 microns)	280	6.9
VOC	1.5 lb/gal	180 g/L
Flash point (SETA)	°F	°C
Amercoat 220	>212	>100

Qualifications

NFPA – Class A

USDA – Incidental Food Contact

Application Data

Applied over	Prepared or primed steel and concrete, previously painted surfaces, wood, aluminum, galvanizing, dry wall
Primer	148, 151, 385, 400, 5105, Dimetcote®21-5 or D21-9

When applying over Dimetcote 21-5, Amercoat 556 Additive must be used.

Surface preparation	See primer application instructions
Method	Conventional or airless spray, brush, roller

Environmental conditions

Temperature	°F	°C
air	40 to 110	4 to 43
surface	40 to 120	4 to 49

Relative humidity (maximum)	°F		
	40	50 to 100	>100
	60%	55%	95%

Surface temperatures must be at least 5°F (3°C) above dew point to prevent condensation.

Formerly Amerguard™ 220

05 Waterborne limitations

Ameron

Amercoat® 300
Waterborne epoxy

Product Data

- Zero VOC
- No hazardous waste generated
- Non-flammable
- Low odor/no shut down
- Solvent-free; no air emissions, water only
- Easily cleaned
- High performance, comparable to solvent epoxy
- Abrasion and impact resistance
- Splash/spillage resistance to a wide range of chemicals
- Chemical and corrosion resistant
- Suitable for most industrial applications
- Adheres to a variety of different coatings
- Durable

Typical Uses

Steel and concrete surfaces in:

- Chemical plants, oil refineries
- Offshore platforms and other structures
- Nuclear facilities
- Food processing facilities
- Pharmaceutical plants
- Hospitals
- Micro chip facilities
- Equipment manufacturing plants
- Storage tank exteriors

Qualifications

USDA – Incidental food contact

Physical Data

Finish*	Gloss	
Color	See Ameron color card	
Components	2	
Curing mechanism	Evaporation of water and chemical reaction between components	
Volume solids (calculated)	44% ± 3%	
Dry film thickness per coat	2 mils (50 microns)	
Coats**	1 or 2	
Theoretical coverage	ft²/gal	m²/L
1 mil (25 microns)	706	17.3
2 mils (50 microns)	353	8.7
VOC mixed	0.0 lb/gal	0.0 g/L
Flash point (SETA) resin and cure	°F	°C
	>200	>93

Application Data

Applied over	Primed steel and primed or prepared concrete, previously coated surfaces
Surface preparation	See specific primer
concrete	ASTM D4259 or ASTM D4260
aged coatings	SSPC-SP1, 3 or 7
Primer	
steel	Amercoat 148, 151
concrete	None** or Nu-Klad® 105A, 114A or 120A
Method	Conventional or airless spray
Mixing ratio (by volume)	1 part resin to 4 parts cure
Induction time	15 - 30 minutes

Pot life (minutes)

°F/°C		
90/32	70/21	50/10
15	45	1½ (hrs)

Note: Pot life can be extended up to 3½ hours @ 70°F (21°C) with the addition of water at ½ pint (6%) per mixed gallon of Amercoat 300, during initial mixing of resin and cure.

Environmental conditions

Temperature	°F	°C
air and surface	50 to 120	10 to 49
Relative humidity		
50 to 100°F	maximum 85%	
above 100°F	maximum 95%	

Surface temperatures must be at least 5°F (3°C) above dew point to prevent condensation.

** Gloss appearance depends on application method and substrate.*

*** Uniform appearance may require two coats of white or light colors on tanks and other large structures over contrasting primers or intermediate coats. Use only a light-colored primer or intermediate coat when one finish coat of white or light color is specified.*

Formerly Amercoat 2203B

ZM 04

Industrial and Marine Coatings

POLY-DURA-THANE

WATER BASED URETHANE

PART A B65W700 ULTRA WHITE
PART B B65V700 HARDENER

PRODUCT INFORMATION

Revised 1/98

PRODUCT DESCRIPTION

POLY-DURA-THANE is an advanced technology, VOC compliant, water based, polyester urethane enamel. Provides performance properties comparable to premium quality solvent based urethanes. Poly-Dura-Thane is a high gloss abrasion resistant urethane that has excellent weathering properties.

- Retains its appearance over a wide range of chemical, weather, and mechanical conditions
- Can be applied directly to water based and solvent based organic zinc rich primers
- Suitable for use in USDA inspected facilities
- Low odor
- Non-flammable

RECOMMENDED USES

For use over prepared substrates in industrial and marine environments, such as:

- Offshore platforms
- Structural steel
- Paper mills
- Power plants
- Conveyors
- Marine applications
- Industrial machinery and equipment
- Exterior surfaces of steel tanks
- Rail cars and locomotives
- Chemical processing equipment
- Bridges
- Refineries

PRODUCT CHARACTERISTICS

Finish:	Gloss, 83+ units at 60°
Color:	Ultra White
Volume Solids:	53%±2%, catalyzed, unreduced 50%±2%, catalyzed, reduced 10% 47%±2%, catalyzed, reduced 25%
Weight Solids:	71%±2%, catalyzed, unreduced
VOC (EPA Method 24):	Unreduced: 68 g/L 0.53 lb/gal
Mix Ratio:	3:1 by volume

Recommended Spreading Rate per coat (at 10% reduction):

Wet mils:	4.0 - 6.0
Dry mils:	2.0 - 3.0
Coverage:	202 - 424 sq ft/gal approximate

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 5.0 mils wet @ 50% RH:

	@ 55°F	@ 77°F	@ 120°F
To touch:	8 hours	1½ hour	45 minutes
To handle:	12 hours	6 hours	2 hours
To recoat:			
minimum:	18 hours	8 hours	2-4 hours
maximum:	14 days	14 days	14 days
To cure:	14 days	10 days	2 days
Pot Life:	4 hours	4 hours	1 hour
Sweetin Timer:	none	none	none

If maximum recoat limits are exceed, abrade surface before recoating. Drying time is temperature, humidity and film thickness dependent.

Shelf Life:	12 months, unopened, at 77°F
Flash Point:	>200°F Setа, catalyzed
Reducer:	Water, 10% minimum reduction required
Clean Up only:	Reducer R7K13

PERFORMANCE CHARACTERISTICS

System Tested: (unless otherwise indicated)
Substrate: Steel
Surface Preparation: SSPC-SP10
Primer: 1 ct. Dura-Pox 245 WB Primer @ 4.0 mils dft
Finish: 1 ct. Poly-Dura-Thane @ 3.0 mils dft

Abrasion Resistance:
Method: ASTM D4060, CS17 wheel, 1000 cycles, 1 kg load
Result: 45 mg loss

Adhesion:
Method: ASTM D4541
Result: 600 psi

Corrosion Weathering:
Method: ASTM D5894, 8 cycles, 2000 hours
Result: Rating 10 per ASTM D610 for rusting, no more than 1/8" rust creepage at scribe

Direct Impact Resistance:
Method: ASTM G14
Result: >160 in lb

Dry Heat Resistance:
Method: ASTM D2485
Result: 200°F constant, 250°F intermittent

Flexibility:
Method: ASTM D522, 180° bend, 1/8" mandrel
Result: Passes

Pencil Hardness:
Method: ASTM D3363
Result: 2H

Salt Fog Resistance:
Method: ASTM B117, 2000 hours
Result: Rating 10 per ASTM D610 for rusting, no more than 1/8" rust creepage at scribe

Thermal Shock:
Method: ASTM D2246, 10 cycles
Result: Passes

continued on back

EM 3/0

Carcinogenic Activator

AST D45+

Envirocoat®

Technical Specification

Product Description
A milky white water suspension two pack Polyurethane Acrylate Coating cross linked with polyfunctional azerdine (free azerdine 0.1%)

Product Detail

	Clear	*Coloured*
PH Value	8.0	9.0
Specific Gravity	1.04	1.24
Solids Content	33.5%	44.4%
Viscosity	15 secs. to FC4	30 secs. to FC4
Thickness Wet	70 - 75 Microns	85 - 95 Microns
Thickness Dry	20 - 25 Microns	30 - 35 Microns
Flash Point	Non Flammable	Non Flammable

Coverage Guide

New Paint and GRP	20-25 sq. mtrs. per litre
Old Paint and GRP	20-22 sq. mtrs. per litre
Stonework, Masonry	7.5-10 sq. mtrs. per litre
Brick, Marble	7.5-10 sq. mtrs. per litre
Cement Screed	8 sq. mtrs. per litre
Roughcast Wall	3.5 sq. mtrs. per litre
Concrete floor on basecoat	15-20 sq. mtrs. per litre (two coats)

Application

Method	HVLP systems are recommended. Brush, roller and conventional spray equipment may be used, providing supplier instructions are followed.
Mixing	Information available on request to approved customers.
Temperature	Information available on request.
Thinning	Water, but not more than 10%.
Pot Life	On request
Drying time	Dust free: 30 approx. minutes. Touch Dry: 2-3 hours Cured: 36 hours
Second Coat	5 minutes at 22 deg. centigrade, with HVLP application.

Independent Tests

Im 108

Specific Use / Specialized Application Equipment

Coatings Resource Corporation

Technical Data

HIGH BUILD EPOXY TANK LINING

CR - 24

INDUSTRIAL COATINGS

Description

CR - 24 is a high build amine cured phenolic epoxy coating designed to protect concrete and steel surfaces at higher temperatures (+200°F.). This class product is applied with heavy duty airless and conventional spray equipment.

Environment

CR - 24 is applied as a chemical resistant tank lining subject to high temperature crude oils, high temperature water and brine, and other selected chemicals as associated with the petrochemical, water & wastewater, mining & milling, pulp & paper, and other selected industries. See chemical resistance guideline for specific environments.

Physical Characteristics

Type:	Amine Cured Epoxy.
Mix Ratio:	Premeasured 1 gal. & 5 gal. kits
Vol. Solids:	75%
Pot Life:	2 Hours @70°F.
Thinner:	Acetone if needed.
Density:	12.0 #/Gal
Substrates:	Prepared Carbon Steel or Prepared Concrete/Masonry
Colors:	Gray, White.
Gloss:	Medium
VOC G/L:	196
DFT/Mils:	2-10
Recoat:	4-48 depending on temperature and humidity. Application Temperature between 40-125°F., 0-90% Relative Humidity.
Flashpoint:	Flammable

Application

Surface Preparation:

Remove all oil, grease, sludge, and other contaminants from surface prior to abrasive blasting. Carbon Steel - Prepare surface to accordance to SSPC-SP10 (Near White Metal Blast Cleanliness) and achieve a 2-3 mil surface profile. Remove all weld spatter and welding residue and all sharp edges. Welds must be ground smooth.

Concrete - Scrape or grind fins and protrusions flush with the surface. Remove surface laitance and protrusions by abrasive blasting in accordance with SSPC-SP7 (brush-off blast cleaning) or Blas-Trac Method in effort to provide an anchor profile. CR-24 is self priming.

Mixing and Thinning:

Mix base component until a homogeneous mixture and color is obtained. Next, mix both components as is needed within the pot life of mixed material. Use air driven power or jiffy mixers.

Application: Use Graco "Hydra-Cat" 45:1 Airless equipment or equal designed for spraying high solids coatings. Use Binks "Airless 1" spray gun with Reverse-A-Clean .021-.023 spray tips, 3/8" or larger solvent resistant fluid line with 1/4 " or larger air supply line. Adjust pump to the lowest possible setting that allows proper atomization. For conventional spray application, use galvanized or other alloy metal pressure tanks with dual regulation and standard duty agitation, Binks "2001" spray gun, #66 fluid nozzle, #66SD air cap, #66S fluid needle, teflon fluid packing, 3/8" or larger solvent resistant fluid line and 1/4" or larger air supply line. Adjust air and material pressure to the lowest possible setting that allows proper atomization.

5582 McFadden Avenue ◇ Huntington Beach ◇ CA 92649
(714) 894-5252 ◇ FAX (714) 893-2322

IM
2-03

Specific Use / Heat Cure.

2031

PROTECTIVE LINING FOR SUPERIOR CORROSION AND HIGH TEMPERATURE RESISTANCE WITH EXCEPTIONAL FLEXIBILITY AND TOUGHNESS

DESCRIPTION

Siloxirane® 2031 is a two-component force cure system that offers unique characteristics.

Siloxirane 2031 is a cross-linked organic-inorganic multifunctional polymer coating that is cured though homopolymerization. This dense crosslinked polymer exhibits high flexibility and toughness, having no detrimental hydroxyl or ester groups.

Due to Siloxirane 2031's temperature resistance (500° F/260° C), it provides superior resistance to:

- Acids, alkalis, solvents, oxidizing agents
- Thermal shock -40° F (-40° C) to +500° F (+260° C)
- Flex stressing
- Wear and abrasion
- Impact

APPLICATION HIGHLIGHTS

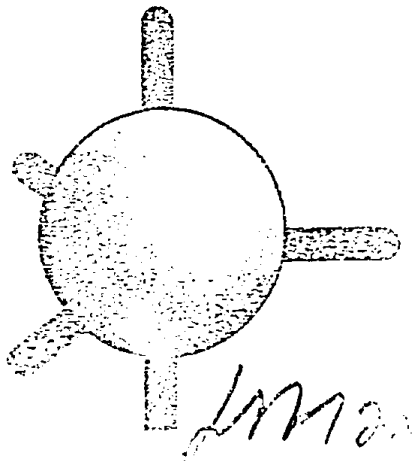
- Superior bonding qualities
- Applied to pitted corroded steel
- Very low VOC - 108 grams/L (0.9 lbs. per gallon)
- Outstanding flexibility
- Non-permeable
- Steam cleanable
- Resists hydroblasting
- Repairable
- Sunlight resistant
- Coefficient of thermal expansion equal to stainless steel
- Complies with FDA 21 CFR 175.300
- Resists high voltage spark test

INDUSTRY APPLICATIONS

- Power Generation - FGD Systems, Ducts, and Stacks, etc.
- Chemical Processing - Tanks, Reactor Vessels, Hazardous Waste Hauling, etc.
- Paper & Pulp - Digesters, Black Liquor Tanks, Bleaching, etc.
- Steel - Pickling Tanks, Acid Storage, Acid Waste Neutralization, etc.
- Mining - Acid Tanks, Scrubbers, etc.

TYPICAL PROPERTIES

- Color (Normal) _____ Oyster White (Can be pigmented)
- V.O.C. Level _____ 108 grams/L (0.9 lbs. /gal.)
- Lead Content _____ Zero
- Chromate Content _____ Zero
- Pot Life _____ 120 min. @ 75° F (24° C)
- Viscosity Reduction _____ Reduce with MEK*
- Flash Point _____ 127° F (53° C)
- Solids by Volume _____ 83.6%
- Solids by Weight _____ 95.5%
- Practical Coverage _____ 73 sq. ft. per gallon at 14 mils DFT
- Recommended DFT _____ 14 mils dry average (16-18 mils wet (2-3 coat application, see directions)
- Shelf Life (unopened can) _____ 12 months



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PHYSICAL PROPERTIES

- Tensile Strength (@75° F) (ASTM D538) _____ 13,240 p.s.i.
- Flexural Strength _____ 13,443 p.s.i.
  Flexural Modulus (ASTM D790) _____ 979 k.s.i.
- Water Absorption (30 Days @88° F) (ASTM D570) _____ 0.09%
- Permeability (Vapor Transmission of Water at 90° C for 7 days) _____ 0.0000 gm. (per sq. ft. per 7 days per inch thickness)
- Coefficient of Thermal Expansion (-50° C to 150° C) _____ 19 (in./in./°C x 10^{-6}) (ASTM D696)
- Elongation (75° F) _____ 11.3%
- Hardness _____ 75-78 Barcol
- Impact Resistance (ASTM D2794) _____ 140 in/lbs
- U.V. Light Resistance (ASTM G53) _____ 40+ years
- Bond Strength (Lap Shear @ 75° F (24° C)) _____ 5,200 PSI (Carbon Steel, Grit Blasted)

APPLICATION DATA

Note: Detailed instructions are provided separately for Siloxirane coating systems.

Surface Preparation

Grit blast to SSPC10 (Sa 2.5). Three to four mil (75-100 micron) blast profile most desired.

Mixing Instructions

Material is supplied in two containers as a unit. Always mix a complete unit in the proportions supplied. (1) Thoroughly mix the contents of Part A with a power agitator until uniform consistency and color is obtained. Be sure that any solids that may have settled through storage have been put back in suspension. (2) Slowly combine the contents of the activator with the previously mixed Part A. (3) Thoroughly mix the two parts until a uniform consistency and color is obtained.

Clean Up Solvent

Acetone, MEK

Limitations

Apply when the air and surface temperatures are above 50° F. Surface temperatures must be at least 5° F above the dew point. For optimum application properties, bring material to 70-90° F prior to mixing and application. Increased temperatures will result in shorter pot life.

Application

Airless spray equipment with 45:1 pump ratio @80-100 lbs. to achieve 2400-3000 p.s.i. tip pressure. Reverse-A-Clean tip .019 to .023, with 3/8" fluid hose, 3/16" by 6' whip hose, with a maximum of 100 linear feet. This coating is a low VOC compliant material. If shop conditions require a viscosity adjustment, thin with MEK.

Cure Time And Temperature

Curing: Blow air over lining for 2 hours to remove solvent prior to curing. Raise temperature of metal substrate 50° F per hour. Maintain at 350° F (177° C) for 4 hours.

(See full Specification for Application of Siloxirane 2031)

Coverage

Practical at recommended film thickness (12-14 mils DFT) - 75-80 square feet per gallon.

Handling Precautions

Solvents and chemicals are contained in this product. Consult the Material Safety Data Sheet for details. Adequate safety and health precautions should be taken during handling, application and drying of this product. The material should be applied under local, state, federal regulations and in accordance with OSHA and ANSI bulletins on safety requirements.

Packaging

Available as:

5 gallon (19 liters) kit with catalyst

1 gallon (4 liters) kit with catalyst

Zun 27

Specific Use — Heat Cure

2431

PROTECTIVE LINING FOR ABRASION RESISTANT SERVICE AT HIGHER TEMPERATURES

DESCRIPTION

Siloxirane® 2431 is an abrasion resistant heat cured polymer lining system. Siloxirane 2431 is a tough, flexible lining designed to handle the abrasiveness of coal, ore, plastic pellets and other media.

Siloxirane 2431 has excellent chemical resistance capable of withstanding the corrosive attack that normally comes with media handled.

Siloxirane 2431EA is for extreme abrasion resistance, modified for services handling fly-ash, oxides, crystals and other abrasive type slurries at temperatures up to 400° F (204° C). Build up to 125 mils by trowelling.

APPLICATION HIGHLIGHTS

- Can be applied to pitted corroded steel surfaces — surface tolerant
- Very high abrasion resistance
- High build
- Low temperature heat cure 300° F (150° C)
- Low VOC - 102 grams/L (0.85 lbs. per gallon)
- Excellent adhesion
- Flexible to take vibration and twisting
- Easily patched by maintenance personnel
- Steam cleanable
- Complies with FDA 21 CFR 175.300
- Resists Hydroblasting

CHEMICAL RESISTANCE

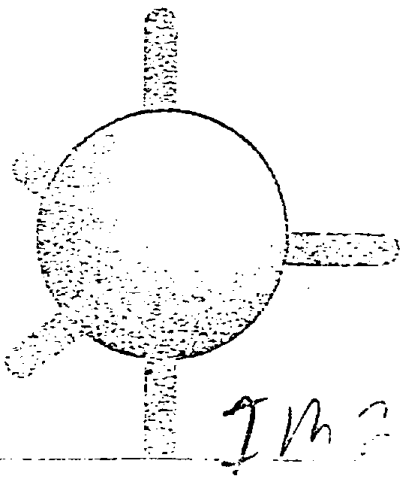
Sulfuric acid to 98%, most solvents including methylene chloride, MEK, methanol, gasohol, distilled water, inorganic acids, dilute organic acids and alkalis. Ideal for corrosive vapor environments.

INDUSTRY APPLICATIONS

- Slurry pipes
- Ducts
- Pumps
- Coal chutes, etc.

TYPICAL PROPERTIES

Color (Normal)	Oyster White
Weight/Gallon	12.5 lbs.
V.O.C. Level/Gal	102 grams/L (0.85 lbs./gal.)
Lead Content	Zero
Pot Life	8 hours at 80° F (27° C) 5 Gals. - 30 mins.
Viscosity Reduction	Reduce with MEK
Flash Point	127° F (53° C)
Solids by Volume	91.0%
Solids by Weight	97.0%
Chromate Content	Zero
Practical Coverage (sq. ft. per gallon)	70
Recommended Film Thickness (dry) mils	20 - 22 mils average
Shelf Life	1 year min at 75° F (24° C)



S.U. Heat Cure

2032

PROTECTIVE LINING FOR SUPERIOR CORROSION RESISTANCE WITH EXCEPTIONAL TOUGHNESS

DESCRIPTION

Sioxirane® 2032 is a two component, ambient or low temperature force cure, multifunctional cross linked organic-inorganic thermoset polymer coating.

Sioxirane 2032 provides superior resistance to:

- Acids, alkalis, and solvents
- Thermal shock -40° F (-40° C) to +400° F (204° C)
- Flex stressing
- Wear abrasion
- Impact
- Under creep corrosion

INDUSTRY APPLICATIONS

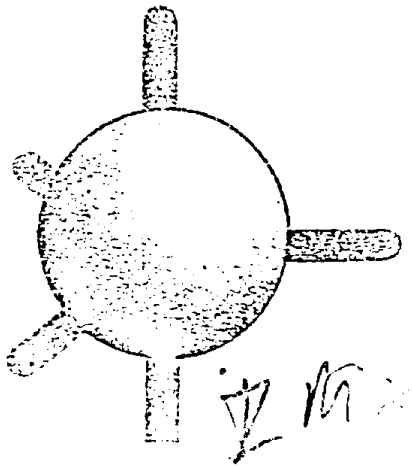
- Chemical Processing - Tanks, Reactor Vessels, Hazardous Waste Hauling, etc.
- Paper & Pulp - Digesters, Black Liquor Tanks, Bleaching, etc.
- Power Generation - FGD Systems, Ducts, and Stacks, etc.
- Steel - Pickling Tanks, Acid Storage, Acid Waste Neutralization, etc.
- Mining - Acid Tanks, Scrubbers, etc.

APPLICATION HIGHLIGHTS

- Superior bonding qualities
- Applied to pitted corroded steel
- Maximum versatility
- Rapid recoat intervals
- Ambient or low temperature force cure
- Very low VOC - 108 grams/L (0.9 lbs. per gallon)
- Outstanding toughness
- Non-permeable
- Steam cleanable
- Resists hydroblasting
- Repairable
- Sunlight resistant
- Coefficient of thermal expansion equal to stainless steel
- Complies with FDA 21 CFR 175.300
- Long pot life
- No primer required

TYPICAL PROPERTIES

Color (Normal)	Oyster White
V.O.C. Level	108 grams/L (0.9 lbs. /gal).
Lead Content	Zero
Chromate Content	Zero
Pot Life	120 Minutes @ 75° F (24° C)
Viscosity Reduction	Reduce with MEK
Flash Point	127° F (53° C)
Solids by Volume	87.6%
Solids by Weight	95.5%
Practical Coverage	96 sq. ft. per gallon at 12 mils DFT
Recommended DFT	12 mils average
Shelf Life	12+ months



PHYSICAL PROPERTIES

- Tensile Strength (@75° F) (ASTM D538) _____ 13,240 p.s.i.
- Flexural Strength _____ 13,443 p.s.i.
  Flexural Modulus _____ 979 k.s.i.
  (ASTM D790)
- Water Absorption (30 Days @85° F) (ASTM D570) _____ 0.09%
- Permeability (Vapor Transmission of Water _____ 0.0000 gm.
  at 90° C for 7 days) (per sq. ft. per 7 days per inch thickness)
- Coefficient of Thermal Expansion _____ 19
  -50° C to 150° C (ASTM D696) (in./in./°C x 10^{-6})
- Adhesive Strength _____ 2850 p.s.i.
- Elongation _____ 6.2%
- Hardness _____ 70-75 Barcol
- Impact Resistance (ASTM D2794) _____ 120 in/lbs

APPLICATION DATA

Note: Detailed instructions are provided separately for Siloxirane coating systems.

Surface Preparation

Grit blast to SSPC10 (Sa 2.5). Three to four mil (75-100 micron) blast profile most desired.

Mixing Instructions

Material is supplied in two containers as a unit. Always mix a complete unit in the proportions supplied. (1) Thoroughly mix the contents of Part A with a power agitator until uniform consistency and color is obtained. Be sure that any solids that may have settled through storage have been put back in suspension. (2) Slowly combine the contents of the activator with the previously mixed Part A. (3) Thoroughly mix the two parts until a uniform consistency and color is obtained.

Clean Up Solvent

Acetone, MEK

Limitations

Apply when the air and surface temperatures are above 15° C (60° F). Relative humidity must be kept at 70% or lower. For optimum application properties, bring material to 20-25° C (68-77° F) prior to mixing and application. Increased temperatures will result in shorter pot life.

Application

Airless spray equipment with minimum 40:1 pump ratio @80-100 lbs. to achieve 3000-3500 p.s.i. tip pressure. Reverse-A-Clean tip .019 to .023, with 3/8" fluid hose, 1/4" x 15 meter whip hose, with a maximum length of 30 meters. This coating is a low VOC compliant material. If shop conditions require a viscosity adjustment, thin with MEK.

Recoat Time (Per Coat)

Temp. Deg. C.	Overcoat Minimum	Overcoat Maximum
15	16 Hrs.	10 Days
20	14 Hrs.	9 Days
25	14 Hrs	9 Days
30	8 Hrs.	7 Days
35	8 Hrs.	6 Days
40	6 Hrs	5 Days

Cure Time And Temperature

When application of the complete coating system has been approved, the coating can be cured by electrically heated air or indirectly combustion heated air only.

13 Days at 20° C (68° F) or,
9 Days at 30° C (86° F) or,
6 Days at 40° C (104° F) or,
10 Hrs. at 50° C (122° F) or,
6 Hrs. at 60° C (150° F) or,
4 Hrs. at 82° C (180° F).

All temperatures are minimum steel substrate temperatures.

(See full Specification for Application of Siloxirane 2032.)

Handling Precautions

Solvents and chemicals are contained in this product. Consult the Material Safety Data Sheet for details. Adequate safety and health precautions should be taken during handling, application and drying of this product. The material should be applied under local, state, federal regulations and in accordance with OSHA and ANSI bulletins on safety requirements.

Packaging

Available as:

5 gallon (19 liters) kit with catalyst

1 gallon (4 liters) kit with catalyst

S U. Heat Cure

2432

ROTECTIVE LINING FOR ABRASION RESISTANT SERVICE

DESCRIPTION

Siloxirane® 2432 is an abrasion resistant two component ambient cured polymer lining system. Siloxirane 2432 is a tough, flexible lining designed to handle the abrasiveness of coal, ore, plastic pellets, ice flows and other media.

Siloxirane 2432 has excellent chemical resistance capable of withstanding the corrosive attack that normally comes with media handled.

APPLICATION HIGHLIGHTS

- Can be applied to pitted corroded steel surfaces — surface tolerant
- Very high abrasion resistance
- High build
- Ambient cure
- Resists ice abrasion
- Low VOC - 102 grams/L (0.85 lbs. per gallon)
- Excellent adhesion
- Flexible to take vibration and twisting
- Easily patched by maintenance personnel
- Steam cleanable
- Complies with FDA 21 CFR 175.300
- Resists hydroblasting

CHEMICAL RESISTANCE

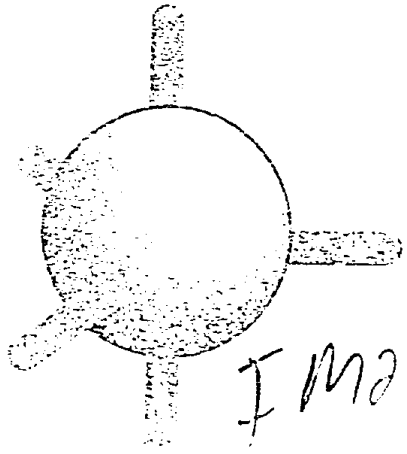
Sulfuric acid to 98%, most solvents including methylene chloride, MEK, methanol, gasohol, distilled water, inorganic acids, dilute organic acids and alkalis. Ideal for corrosive vapor environments.

INDUSTRY APPLICATIONS

- Hopper cars
- Slurry pipe
- Legs of oil platforms
- Pumps
- Underwater areas of ships for resisting ice abrasion
- Small boats and yachts to resist sand abrasion

TYPICAL PROPERTIES

Color (Normal)	Light Gray
Weight/Gallon	12.5 lbs.
V.O.C. Level/Gal.	102 grams/L (0.85 lbs./gal.)
Lead Content	Zero
Pot Life	120 mins @ 75° F (24° C)
Viscosity Reduction	Reduce with MEK
Flash Point	127° F (53° C)
Solids by Volume	91.0%
Solids by Weight	97.0%
Chromate Content	Zero
Practical Coverage (sq. ft. per gallon)	70
Recommended Film Thickness (dry) mils	22 mils average
Shelf Life	1 year min at 50-90° F (10-32° C)



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APPLICATION DATA

Note: Detailed instructions are provided separately for Siloxirane coating systems.

Surface Preparation

Grit blast to SSPC10 (Sa 2.5). Three to four mil (75-100 micron) blast profile most desired.

Mixing Instructions

Material is supplied in two containers as a unit. Always mix a complete unit in the proportions supplied. (1) Thoroughly mix the contents of Part A with a power agitator until uniform consistency and color is obtained. Be sure that any solids that may have settled through storage have been put back in suspension. (2) Slowly combine the contents of the activator with the previously mixed Part A. (3) Thoroughly mix the two parts until a uniform consistency and color is obtained.

Clean Up Solvent

Acetone, MEK

Limitations

Apply when the air and surface temperatures are above 50° F. Surface temperatures must be at least 5° F above the dew point. For optimum application properties, bring material to 70-90° F prior to mixing and application. Increased temperatures will result in shorter pot life.

Application

Siloxirane 2432 — Airless spray equipment with 30:1 pump ratio @80-100 lbs to achieve 2400-3000 p.s.i. tip pressure. Reverse-A-Clean tip .019 to .023, with 3/8" fluid hose, 3/16" by 6' whip hose, with a maximum of 100 linear feet. This coating is a low VOC compliance material. If shop conditions require a viscosity adjustment, thin with MEK.

Cure Time And Temperature

(A) Curing at Elevated Temperatures: Blow air over lining for 2 hours to remove solvent prior to curing. Raise temperature of metal substrate 50° F per hour. Maintain at 180° F for 4 hours.

(B) Curing at Ambient Temperatures: The temperature should be 60° F or above. Lining will lose tackiness and become hard in 2 to 4 hours, depending on the prevailing temperature. Full curing will occur in 2 to 7 days, depending on temperature.

Coverage

Practical at recommended film thickness:

2432 — (20-22 mils DFT)
70 sq. ft./gal.

Handling Precautions

Solvents and chemicals are contained in this product. Consult the Material Safety Data Sheet for details. Adequate safety and health precautions should be taken during handling, application and drying of this product. The material should be applied under local, state, federal regulations and in accordance with OSHA and ANSI bulletins on safety requirements.

Packaging

Available as:
5 gallon (19 liters) kit with catalyst
1 gallon (4 liters) kit with catalyst

1 May

LINE

PROTECTIVE LINING FOR SUPERIOR CORROSION AND HIGH TEMPERATURE RESISTANCE WITH EXCEPTIONAL FLEXIBILITY AND TOUGHNESS

DESCRIPTION

PowerLine® coating is specially formulated with Siloxirane® polymer resin for handling the high temperature and abrasion requirements of the power industry. PowerLine® is a two-component force cure system that offers unique characteristics. PowerLine is a cross-linked organic-inorganic multifunctional polymer coating that is cured though homopolymerization. This dense crosslinked polymer exhibits high flexibility and toughness, having no detrimental hydroxyl or ester groups. Due to PowerLine's temperature resistance (500° F/260° C), it provides superior resistance to:

- Acids, alkalis, solvents, oxidizing agents
- Thermal shock -40° F (-40° C) to +500° F (+260° C)
- Flex stressing
- Wear and abrasion
- Impact

APPLICATION HIGHLIGHTS

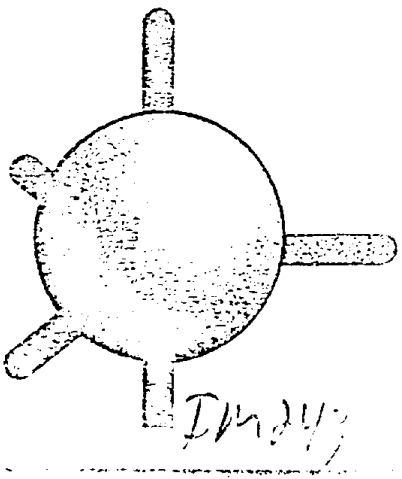
- Resists fly ash abrasion
- Low coefficient of thermal expansion
- Very high bond strengths 5200 PSI on grit blasted steel
- Smooth, low surface energy reduces fly ash buildup in ducts and stacks
- Applied to pitted corroded steel
- Very low VOC - 108 grams/L (0.9 lbs. per gallon)
- Outstanding flexibility
- Non-permeable
- Steam cleanable
- Resists hydroblasting
- Repairable
- Sunlight resistant
- Coefficient of thermal expansion equal to stainless steel
- Resists high voltage

INDUSTRY APPLICATIONS

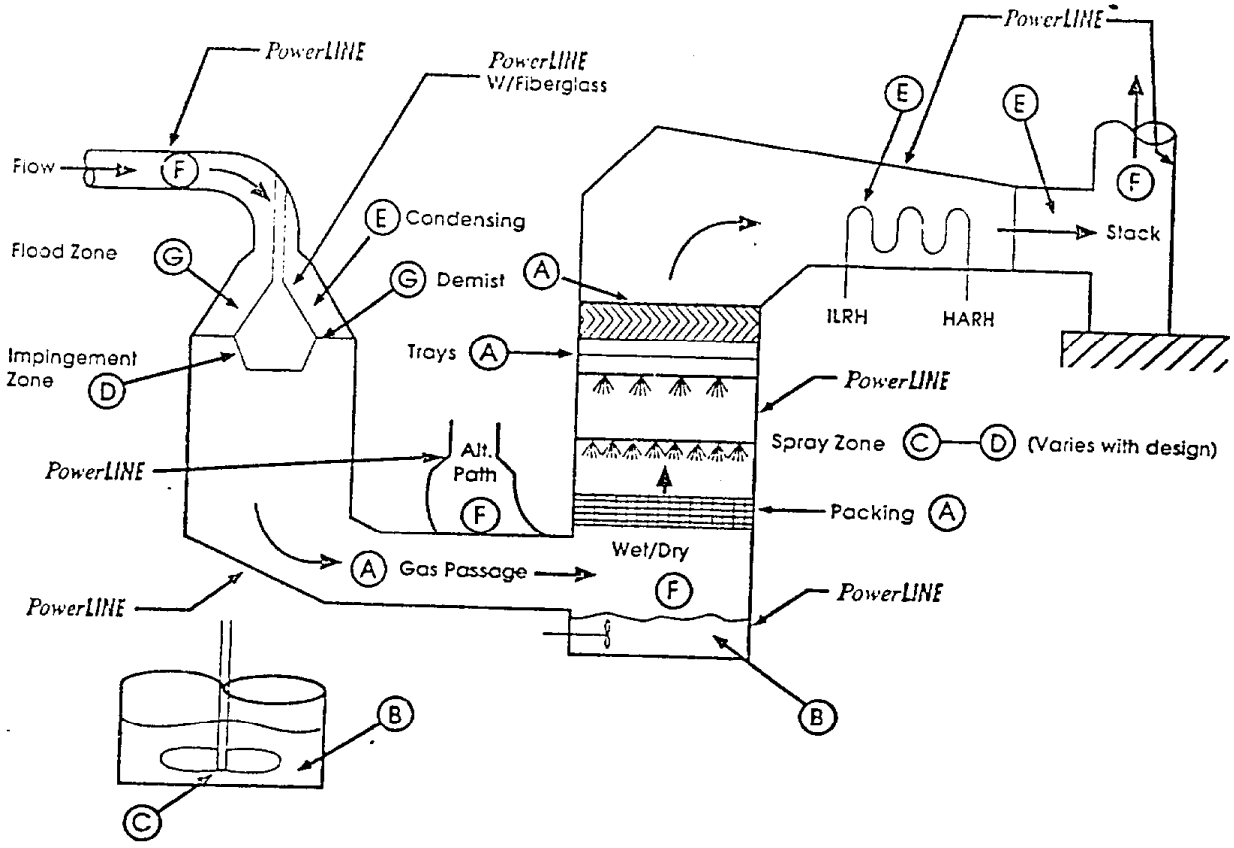
- Stacks
- Chimneys
- Ducts
- Flu gas desulfurization scrubbers
- Chemical scrubbers
- Pre-scrubbers
- Spray towers
- Fans

TYPICAL PROPERTIES

- Color (Normal) _____ Oyster White (Can be pigmented)
- V.O.C. Level _____ 108 grams/L (0.9 lbs. /gal.)
- Lead Content _____ Zero
- Chromate Content _____ Zero
- Pot Life _____ 120 min. @ 75° F (24° C)
- Viscosity Reduction _____ Reduce with MEK
- Flash Point _____ 127° F (53° C)
- Solids by Volume _____ 90%
- Solids by Weight _____ 95.5%
- Practical Coverage _____ 75 sq. ft. per gallon at 14 mils DFT
- Recommended DFT _____ 14 mils dry average 16-18 mils wet (1-2 coat application, see directions)
- Shelf Life (Unopened can) _____ 12 months



Typical FGD Schematic (non-denominational) Showing Various Lining Zones for PowerLine

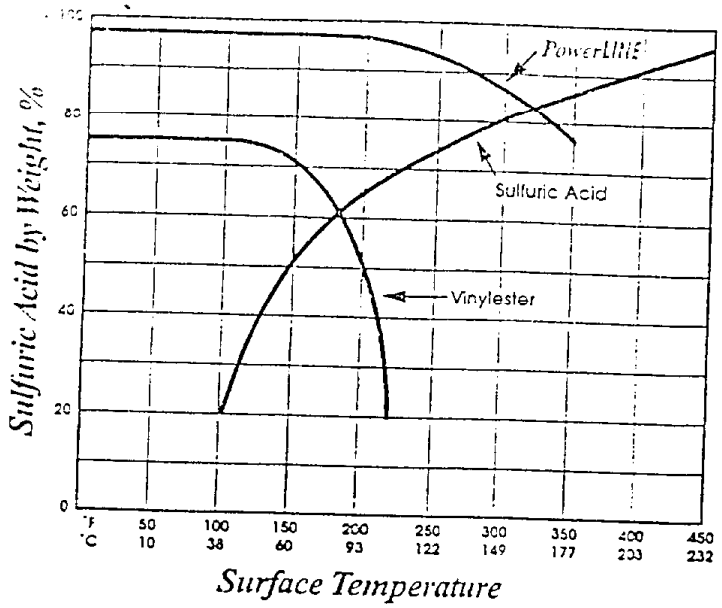


Explanation of Above Codes Used to Define Lining Environment

Code	Chemistry	Mechanical Environment	Temp	Recommendation
A	Mild Corrosive (Vapor)	Mildly Abrasive	High	PowerLine
B	Moderate (Immersion)	Mild	Mild	PowerLine
C	Moderate	Moderate	Mild	PowerLine
D	Moderate	Severe	Mild	PowerLine
E	Severe	Mild	Moderate	PowerLine
F	Severe	Mild	Severe	PowerLine
G	Severe	Severe	Severe	PowerLine

Environmental Severity Level

1) Temperature - Mild 93°C (200°F) to 177°C (350°F) (Severe)
2) Corrosion - Mild 30% to 80% Sulfuric Acid (Severe)
3) Erosion - High Energy Fly Ash Particles



PowerLine vs. Vinylester at Temperatures and H_2SO_4 Concentrations Found in Ducts and Stacks

APPLICATION DATA

Note: Detailed instructions are provided separately for PowerLine coating systems.

Surface Preparation

Grit blast to SSPC10 (Sa 2.5). Three to four mil (75-100 micron) blast profile most desired.

Mixing Instructions

Material is supplied in two containers as a unit. Always mix a complete unit in the proportions supplied. (1) Thoroughly mix the contents of Part A with a power agitator until uniform consistency and color is obtained. Be sure that any solids that may have settled through storage have been put back in suspension. (2) Slowly combine the contents of the activator with the previously mixed Part A. (3) Thoroughly mix the two parts until a uniform consistency and color is obtained.

Clean Up Solvent

Acetone, MEK

Limitations

Apply when the air and surface temperatures are above 50° F. Surface temperatures must be at least 5° F above the dew point. For optimum application properties, bring material to 70-90° F prior to mixing and application. Increased temperatures will result in shorter pot life.

Application

Airless spray equipment with 45:1 pump ratio @80-100 lbs. to achieve 2400-3000 p.s.i. tip pressure. Reverse-A-Clean tip .019 to .023, with 3/8" fluid hose, 3/16" by 6' whip hose, with a maximum of 100 linear feet. This coating is a low VOC compliant material. If shop conditions require a viscosity adjustment, thin with MEK.

Cure Time And Temperature

Curing: Blow air over lining for 2 hours to remove solvent prior to curing. Raise temperature of metal substrate 50° F per hour. Maintain at 350° F (177° C) for 4 hours.

(See full Specification for Application of PowerLine)

Coverage

Practical at recommended film thickness (12-14 mils DFT) - 75-80 square feet per gallon.

Handling Precautions

Solvents and chemicals are contained in this product. Consult the Material Safety Data Sheet for details. Adequate safety and health precautions should be taken during handling, application and drying of this product. The material should be applied under local, state, federal regulations and in accordance with OSHA and ANSI bulletins on safety requirements.

Packaging

Available as:

5 gallon (19 liters) kit with catalyst

1 gallon (4 liters) kit with catalyst

Specialized Application Equipment

Ameron

Amercoat® 428PC

100% solids epoxy

Product Data

- High build
- High performance maintenance coating for new and old steel
- High gloss, easily cleaned
- Good chemical and corrosion resistance
- Meets VOC requirements
- More flexible and abrasion resistant than conventional epoxy coatings

The 100% solids characteristic of Amercoat 428PC reduces the chances of pinholing and solvent entrapment at the substrate coating interface, often a major cause of coating failure with conventional epoxies and lower solids systems.

Typical Uses

- Lining for hopper cars and barges carrying dry bulk chemicals, plastic pellets and dry bulk edibles
- Industrial facilities, bridges, tank exteriors, rail cars
- Marine and offshore exposures
- Waste water treatment facilities, piping, roofs, oil tanks
- Good resistance to fumes and splash/spillage of many chemicals. Contact your Ameron representative for specific information.

Systems Using Amercoat 428PC

Maximum topcoat time limitation @ 70°F (21°C)

1st Coat	2nd Coat	Max. Topcoat Time
428PC	None	–
83HS	428PC or 5401HSA	2 days
428PC	Amershield™	7 days
428PC	450HS	3 days
428PC	428PC	21 days

Chemical Resistance Guide for Amercoat 428PC

Environment	Splash and Spillage	Fumes and Weather
Acidic	F	G
Alkaline	E	E
Solvents	G	E
Salt Water	E	E
Water	E	E

F-Fair G-Good E-Excellent

Physical Data

Finish	Gloss
Color	White, pearl gray, oxide red, ivory, light blue, medium gray, black, bahama beige, gray
Components	2
Curing mechanism	Chemical reaction between components
Volume solids (calculated)	100%
Dry film thickness per coat	6 to 12 mils (150-300 microns)
Coats	1 or 2

Theoretical coverage	ft²/gal	m²/gal
1 mil (25 microns)	1604	39.4
12 mils (300 microns)	133.7	3.3
VOC mixed	0.0 lb/gal	0.0 g/L

Temperature resistance	Dry °F	Dry °C
continuous	200	93
intermittent	250	121

Flash point (SETA)	°F	°C
428PC cure	>212	>100
428PC resin	>212	>100
Amercoat 928*	175	79
Amercoat 12	0	-18
Amercoat 65	78	25

Application Data

Applied over	Steel, concrete, aluminum
Surface preparation	Abrasive or water blast, mechanical cleaning
Method	Plural component heated airless spray
Mixing ratio (by volume)	1 part resin to 1 part cure

Potlife (hours)✓	°F/°C 90/32	70/21	50/10
Amercoat 428PC	¼	½	1

Environmental conditions Temperature	°F	°C
air and surface	40 to 120	4 to 49
material	130 to 165	54 to 74

Surface temperatures must be at least 5°F (3°C) above dew point to prevent condensation.

Cure at 50°F minimum – may be exposed to temperature below 50°F during cure, but cure time will be extended.

**Use of Amercoat 928 avoids generation of hazardous waste.*

Formerly Amercoat 320SPC

IM 251

Specialized Application

POLYQuik®
SPRAY POLYUREA COATINGS

POLYQuik® spray polyurea products are tough, fast-curing coatings that offer excellent abrasion, corrosion and chemical resistance with a 100% solids content.

Why Use POLYQuik®
- Sets in seconds to reduce facility downtime
- No topcoat required
- Meets air quality regulations with solvent-free performance
- Excellent chemical resistance
- Versatility for use throughout the entire plant
- May be used in temperature and weather extremes
- Available in a variety of colors

Where to Use POLYQuik®
Secondary containment coatings: gasoline and other fuels, oils, liquid fertilizers, solvents, and other chemical products

Protective coatings: concrete, asphalt, wood, steel and other metals, for use in wastewater facilities, mines, and railcars

Abrasion resistant coatings: industrial flooring, truck beds, and mines

Surface Preparation
The surface to be coated must be clean and dry with all loose substrate and rust removed. The following preparation standards are required prior to applying POLYQuik:

Steel–SSPC-SP10, SSPC-SP6

Asphalt–free of oil and grease, air blasted to remove loose product

Concrete–abrasive blasting or water blasting, remove oil and grease prior to blasting

Metals–SSA-SP1 solvent clean and brush off blast

Geotextiles–minimize wrinkles

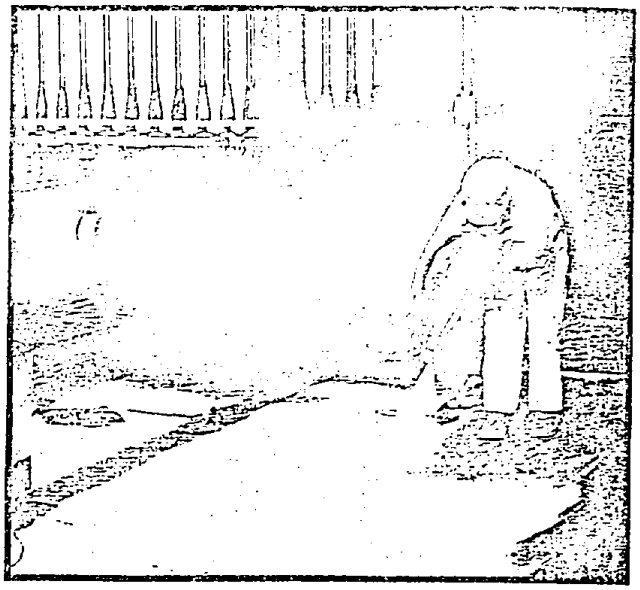
Other–Contact your POLYQuik Sales Representative

Application Parameters
Theoretical Coverage Per Gallon–1600 square feet

Application Equipment
- Gusmer Models H-3500 or Marksman
- Gusmer GX-7 spray gun
- 40kW generator
- Air compressor

Note: Physical properties of POLYQuik are affected by application temperature and system air pressure. POLYQuik requires a minimum pressure of 2200 psi and a minimum spray temperature of 150°F.

Surface Temperature
A minimum temperature of 40°F is required unless otherwise approved by a POLYQuik Sales Representative.



Application to Wet Surfaces
POLYQuik will cure completely on wet substrates with no pinholes. However, check with your POLYQuik Sales Representative for further details before application on damp substrates.

Recoating
Recoating, if necessary, should be done within the first 12 hours after the initial application.

- After 12 hours, soften the entire surface of the coating with Acetone or MEK, wipe substrate dry, then apply the additional layer(s) of POLYQuik. Abrading the surface may also be necessary to achieve a proper surface for application.
- If more than 12 hours elapses before the initial coating is completely applied, you may prepare just a one foot strip of the edge of the portion previously sprayed as instructed above. Then, continue spraying the remainder of the uncoated application area.

Storage and Handling
Store POLYQuik at 60–90°F in a low moisture environment. Do not store outside. Storage at lower than 60°F will result in damage to the product and may adversely affect performance. Avoid excessive exposure to isocyanate or A component. If either A or B component comes in contact with skin, rinse thoroughly with water (see Material Safety Data Sheet). Shelf life is approximately one year. Storage in extreme conditions may lead to a decrease in shelf life.

POLYQuik® Characteristics

Color	Black, white, or gray; custom tints available
Solids	100% by volume
VOC	0
Mix Ratio	1:1 by volume
Gel Time	5 seconds
Tack-Free Time	20 seconds
Cure Time	12 hours minimum; 24 hours preferred
Chemical Resistance	Excellent

Evan

NEW TECHNOLOGIES for Ultralow-VOC Polyurethane Coatings

As formulators decrease the level of VOCs in two-part, solventborne polyurethane coatings, they have to contend with a number of handling and application difficulties. This article presents two new technologies that work together to solve these problems.

Two-part, solvent-based coatings systems using aliphatic isocyanates and polyester or acrylic polyols have become the industry standard for weatherable topcoats. These coatings systems combine resistance to chemical and physical damage with high gloss levels and long-term retention of gloss, color and mechanical properties. Traditionally, these coatings systems have been formulated with a liquid polyisocyanate as one component and a high-molecular-weight, high-functionality polyol along with associated pigments and additives as the second component.[1]

A driving force in the reformulation of coatings is the need to reduce solvent emissions on application. One disadvantage of conventional polyurethane formulations is the high solvent demand of the polyol component. This factor has limited the volatile organic compounds (VOCs) reduction available with traditional polyol systems.

One route to lowering VOCs is to use lower-molecular-weight polyols. As formulators have incorporated more lower-molecular-weight (lower-viscosity) polyols into their systems, there has been an inevitable trade-off in the physical properties of the resulting coatings and or handling of the reactive mixture.

Many low-VOC polyurethane coatings suffer from poor solvent resistance, poor flexibility and an extreme sensitivity to catalyst level as it affects the cure profile. In addition, with less solvent in the formulation and fewer ingredients to manipulate, maintaining convenient mixing ratios has also been a struggle.

Studies described in this article demonstrate using two technologies developed to help solve these formulating problems. One technology is a process to make narrow-molecular-weight-distribution, isocyanate-terminated polyurethane prepolymers. A second technology is the creation of ultralow-viscosity oxazolidine and aldimine oxazolidine reactive diluents. Using these materials developed specifically for use in high-solids polyurethane coatings directly achieves the following benefits:

- formulating to low VOCs (down to 2.08 lb/gal conventionally applied)
- controlling reactivity of low-VOC systems
- enhancing coating performance and
- attaining formulation flexibility and ease of use.

The data presented here describes these technologies in more detail and shows how using them, both separately and together, provides new tools for polyurethane-coatings formulators.

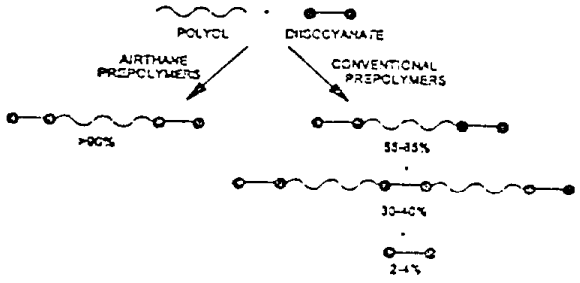
By Sherri L. Bassner
Senior Principle Applications Chemist
Chemicals Technology Group
Air Products and Chemicals Inc.
Allentown, Pa.
and Thomas Johnson
Commercial Development Manager
ANGUS Chemical Co.
Buffalo Grove, Ill.

Polyurethane Prepolymers

Polyurethane prepolymers have been used in certain segments of the coatings, adhesives, sealants and elastomer industries for many years.[2] By forming a prepolymer, diisocyanate-monomer content is reduced, and the reactivity of this partially reacted system is easier to control. These prepolymers, however, have limited use in higher-solids coatings formulations.

The traditional synthesis process typically involves the exothermic reaction of one equivalent of polyol with two equivalents of diisocyanate monomer. The desired end-product, the isocyanate-capped polyol, makes up only about half of the final product mixture's weight. Using this process, many of the diisocyanate monomer molecules react through both isocyanate groups, creating high-molecular-weight oligomers. These oligomeric species, which can be much larger than the simple 3:2 diisocyanate-polyol adduct shown in Figure 1, lead to high solvent demand, relatively short pot lives and poor sprayability in prepolymer-based coatings formulations.

Fig. 1 Airthane® Versus Conventional Technology



New technology, which is described in other data sheets,[3-6] has made available polyurethane prepolymers (under the tradename Airthane® prepolymers) that have half of the viscosity of their counterparts and extremely low diisocyanate monomer levels (<0.1% for aromatic isocyanates and <1% for aliphatic isocyanates). These materials, made by a process that keeps the oligomer content very low, have the lower solvent demand and favorable pot life-dry time balance needed for high-solids formulating.

Reactive Diluents

Reactive diluents are low-viscosity co-reactants designed to lower the VOCs in coating systems. While they generally reduce the viscosity of the polymeric composition similar to a solvent, they must also undergo reaction with polyisocyanates to effectively reduce VOCs. Reactive diluents should not be confused with high-boiling solvents or solvated polyols.

The ideal reactive diluent for a solventborne polyurethane coating should possess the following traits:

- low intrinsic viscosity;
- good solubility/solvency;
- relatively high equivalent weight;
- reasonable pot life/cure response; and
- good film performance/weathering.

There are a myriad of products in the industrial-coatings marketplace that are being promoted as reactive diluents for high-solids polyurethane coatings. Very few measure up to the stringent definition above. Examples of reactive diluents currently in use include low-molecular-weight diols/polyols, hindered amines, aldimines, ketimines and oxazolidines.[7]

Polyester and acrylic polyols are polymers that can be easily crosslinked with polyisocyanates to produce highly durable coatings. Unfortunately, the high molecular weight and hydroxyl functionality that make these resins so attractive also inherently lead to high intrinsic viscosities. As solvent content is reduced in polyurethane coatings containing these workhorse polyols, system viscosities rapidly rise above a desirable range for most applications.

One way to solve this problem is to use lower-molecular-weight polyols or even diols in a polyurethane system. Unfortunately, as the polyol backbone is reduced, so are many of its performance qualities.[7] Some of these polyols contain significant amounts of low- (or no-) functionality oligomers, leading to coatings with poor chemical resistance. Others are very highly functional, leading to coatings with poor mechanical properties.

The trade-off between polyol molecular weight and system performance seriously hinders sole reliance on this technology for achieving VOC compliance. Most high-solids polyols are sold as 60% to 80% weight solutions with intrinsic viscosities well above 5,000 centipoise.

Amine compounds can serve as an alternative to polyols in two-component polyurethane industrial coatings. Amines react quite readily with polyisocyanate to yield polyureas. Amines are also much lower in intrinsic viscosity than polyols, making them very effective reactive diluents. Unfortunately, the reaction between amines and isocyanates is so rapid that these diluents are generally not practical unless plural-component application equipment is used. One exception may be some of the recent hindered amines based on polyaspartic ester technology.[8]

Ventura County
Air Pollution
Control District

669 County Square Drive
Ventura, California 93003

tel 805/645-1400
fax 805/645-1444

Richard H. Baldwin
Air Pollution Control Officer

April 4, 2000

Jim Nyarady, Manager
Strategy Evaluation Section
Stationary Source Division
California Air Resources Board
2020 L Street
Sacramento, CA 95812

Subject: Draft Program Environmental Impact Report - Suggested Control Measure for Architectural Coatings

Dear Mr. Nyarady:

Ventura County Air Pollution Control District (APCD) staff has reviewed the Draft Program Environmental Impact Report (EIR) for the Air Resources Board's (ARB) Suggested Control Measure (SCM) for Architectural Coatings. District staff finds the Draft Program EIR to be
11-1 thorough and accurate, and concurs with the conclusions made in the EIR with respect to significance of impacts. The certification of this Program EIR by the ARB will assist local air districts by providing a document that each district may incorporate by reference in whatever CEQA documents they intend to prepare for their own local architectural coating rules.

After reviewing the EIR, District staff offers the following comments:

General Comments:

VOC Content Calculations

The "VOC content" of coatings is presented in several tables throughout the text of the EIR. In some instances, the VOC content is expressed as grams per liter of material, less water and
11-2 exempt solvents (for example, in Table II-3). In other instances, the method of calculating VOC content is not indicated (for example, in Tables II-2, IV-2, and IV-3). The two calculation methodologies for VOC content (presented in Section 6.1 of the SCM) can yield significantly different values. Therefore, in each instance where the VOC content of coatings is presented, the calculation methodology should be clearly indicated. Based on the information presented in Table II-3 of the EIR, it is not clear how the anticipated VOC emission reductions were calculated.

Consistency With Air Quality Plans

The Executive Summary (Page I-7, Section 4.a.) states that "air quality impacts are considered
11-3 significant if the proposal would conflict with or obstruct implementation of the applicable air quality plan." However, the discussion of "Significance Criteria" presented in Section IV.C.1. (Page IV-61), does not include a discussion of "Consistency" with air quality plans. Instead, the

11-3 matter of "Consistency" is deferred to a later section in the EIR (Section IV.F.), which is not discussed in the Executive Summary. District staff suggests that either the "Consistency" discussion be included in the "Air Quality Impacts" section of the EIR, or that the Executive Summary be revised to reflect the actual format and content of the text in Section IV of the EIR.

Air Quality Impacts

11-4 The discussion of air quality impacts (Section IV) includes an extensive analysis of potential negative air quality impacts attributable to the proposed SCM. The "Project Description" section (Section II) of the EIR details the purpose of the SCM, and discusses the reduction of VOC emissions statewide as a result of implementation of the SCM. However, the positive air quality impacts that are anticipated to result from implementation of the SCM are discussed very little within the text of Section IV. District staff suggests that Section IV include a more detailed discussion of the positive air quality impacts, such as the reduction of VOC emissions and subsequent lowering of ambient ozone concentrations on a statewide basis.

Specific Comments:

Page IV-60, Section IV.B., Thresholds of Significance

11-5 The third sentence of the second paragraph on this page states that SCAQMD's significance criteria tend to be the most conservative. It should be noted that Ventura County APCD's significance thresholds are more conservative at 25 lb/day for ROC (VOC) and NOx for most of the county, and 5 lb/day for the Ojai Planning Area portion of the county.

Page IV-82, Section IV.C.1., "Overall Conclusion"

11-6 The "Overall Conclusion" discussion indicates that the SCM will result in statewide VOC emission reductions of approximately 14 tons per day (excluding the SCAQMD) by the year 2004. This statement conflicts with the figure of approximately 11 tons per day presented in Table II-3 and in the second paragraph on Page IV-61.

If you have any questions, please call Molly Pearson of my staff at (805) 645-1439.

Sincerely,

Scott Johnson, Manager
Planning and Evaluation Division

c. Dick Baldwin, Ventura County APCD
Mike Villegas, Ventura County APCD

GOLDEN
ARTIST COLORS

Golden Artist Colors, Inc.
New Berlin, NY 13411 USA
Phone: 607-847-6154
Fax: 607-847-6767

April 5, 2000

Mr. Jim Nyardy, Manager, Strategy Evaluation Section
Stationary Source Division
Air Resources Board
2020 L St., PO Box 2815
Sacramento, CA 95812

RE: Comments on Draft EIR
FROM: Ben Gavett, Director of Safety and Compliance, Golden Artist Colors, (607)847-6154

Thank you for the opportunity to comment on this draft. My comments are specific to the Faux Finishing Category. We are requesting that the Proposed Limit be changed from 350 g/l to 700 g/l. The 350 g/l limit is insufficient because the faux finish products currently on the market that are below this level do not meet the performance criteria for professional faux finishers. I have attached comments from professionals who have used the various products mentioned in the Draft EIR, Appendix D. The 700 g/l limit would also be consistent with the federal EPA's Architectural Coatings rule.

12-1 The ARB believes that a product at 350 g/l has the same open time as a product at 700 g/l (response to Issue #1, page 34, Appendix D). No basis is provided for this statement, but we expect that the information was gleaned from product labels and literature. Rather than rely on *reported* open times from the various manufacturers mentioned in Appendix D, we are submitting results of side by side comparisons and testing where the materials are evaluated under identical conditions. As could be expected, the amount of open time is directly proportional to the VOC level. The low VOC products tested, with reported VOC up to 350 g/l, had 7-10 minutes open time on the edges. A wet edge is critical for doing these techniques, in order to be able to blend one work area into the next. Golden Glazing Liquid was open for 20 minutes. Perhaps the simplest of techniques can be accomplished with products having the shorter open times. However, more sophisticated finishes require more steps and even 20 minutes challenges finishers trying to minimize work area while maintaining the proper scale and continuity of the pattern.

In summary, while there are faux finishing glazes on the market that are under 350 g/l, they often do not meet the open time requirements professional finishers need (see attached comments). Since these coatings do represent a minor percentage of the overall sales from architectural coatings, the impact of accommodating these needs is relatively insignificant.

From: "Pat Pangburn" <pangburn@utm.net>
To: "Laurie H." <LaurieJill@aol.com>, <Ben@goldenpaints.com>
Date: 4/5/00 9:18PM
Subject: Fw: Golden Acrylic Glazing Liquid

-----Original Message-----
From: Roger Pangburn <rpangbur@utm.net>
To: jnyarady@arb.ca.gov <jnyarady@arb.ca.gov>
Date: Wednesday, April 05, 2000 6:17 PM
Subject: Golden Acrylic Glazing Liquid

Dear Mr. Nyarady

I have been informed that you are the person at the Air Resources Board to contact concerning a problem I have been having obtaining the acrylic glazing liquid manufactured by Golden Paints.

Yes, I can purchase it here in San Diego County - but only in quart bottles. I need it a gallon at a time for use as a professional faux finisher. I have tried various other water-based glazing products that are sold here by the gallon (Benjamin Moore, McCloskey's, Behr,etc.) with less than perfect results for the faux finishes that I use in my business.

I have been informed that the reason I can't get this product by the gallon has something to do with "air quality" problems during the drying period. Frankly, I personally have never noticed the least problem working with this product, and I have worked with it a lot over a five year period. It doesn't come close to the toxicity that is obviously apparent in many other products commonly used on construction sites where I have worked (i.e. Bondo, lacquer, lacquer thinner, paint thinner, acetone, ammonia, denatured alcohol and various other solvents and sealers.)

If there is anything you can do to put this benign and superior product back on the San Diego store shelves in gallon containers, I would really appreciate it. (It is costing me a fortune to by it by the quart!!!!)

Thank you for your time and consideration of this problem.

Pat Pangburn : pat@thepangburns.com

From: <LaurieJill@aol.com>
To: <jnyarady@arb.ca.gov>
Date: 4/5/00 1:40PM
Subject: Golden Glazing Liquid

Dear Mr. Nyarady,

I am a faux finisher working in San Diego County. My partner and I have been professionals in this field for over 6 years and do high quality decorative work in very expenseive homes. We have found Golden Glaze to be a superior glazing compound for our finishes. We have tried other brands such as McCloskeys and Benjamin Moore and find them to be less useful in texture and flow than the Golden. The Golden Glaze is the only one that accomplishes acceptable finishes over flat latex paint allowing us to go over many existing walls without having to repaint with an eggshell or lo-sheen paint, thereby saving the homeowner from the expense and time of having to repaint their walls in order to get what they want.

We have never understood why this high quality product is not available in gallons. I can walk into Home Depot and buy a gallon of lacquer thinner but I can't buy this product anywhere.

We respectfully request that you consider selling this product by the gallon because it is a superior glaze unlike any other on the market.

Thanks for you consideration.

Laurie Hansley

CC: <Ben@goldenpaints.com>

Department of Water and Power the City of Los Angeles

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Mayor

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RICK J. CARUSO, *President*
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JOHN C. BURMAHLN, *Secretary*

S. DAVID FREEMAN, *General Manager*

April 6, 2000

Mr. Dean C. Simeroth, Chief
Criteria Pollutants Branch
Stationary Source Division
California Air Resources Board
2020 L Street
Sacramento, CA 95812

Dear Mr. Simeroth:

Comments on
Suggested Control Measure for Architectural Coatings (SCM)
Los Angeles Department Of Water And Power (LADWP)

The LADWP appreciates having this opportunity to comment on the "Draft 2/11/00 strikeout/underline version from the 12/1/99 SCM." The LADWP has participated in workshops and has met twice with the California Air Resources Board (CARB) on the proposed SCM.

The LADWP provides water and electric service to the City of Los Angeles and has equipment located outside of the South Coast Air Quality Management District (SCAQMD) that would be impacted by the SCM. The LADWP understands the importance of reducing volatile organic compounds (VOC) emissions to atmosphere and looks forward to further working with the CARB to produce an SCM that is reasonable, effective, and is based on sound technical data. The following are the LADWP's comments.

Testing

13-1 As your staff knows, the LADWP is a participant with other "Essential Public Service Agencies (Agencies)" and the SCAQMD in a low VOC coatings test program (Test Program) required by an SCAQMD Board Resolution for its Rule 1113 – "Architectural Coatings." The purpose of this Test Program is to determine if low VOC coatings

111 North Hope Street, Los Angeles, California Mailing address: Box 51111, Los Angeles 90051-0100
Telephone: (213) 367-4211 Cable address: DEWAPOLA FAX: (213) 367-3287
Recyclable and made from recycled waste.

(i.e., 100 and 250 grams/liter) perform adequately to protect against corrosion compared to the currently used higher VOC coatings. The LADWP feels that this Test Program is essential to justify a 250 grams/liter VOC limit for "Industrial Maintenance Coatings (IMCs)." As such, the LADWP recommends that the CARB formally recognize this Test Program in the final Environmental Impact Report for its SCM (in Section II-E – Development Of The SCM). LADWP feels that these test results are critical in determining the low VOC limits for IMCs and that other industries will be very much interested in the results.

13-1

Extension Of IMC Compliance Date

The LADWP supports CARB's decision to extend the compliance date for the IMC limit of 250 grams/liter from January 1, 2003 to January 1, 2004. The LADWP views 250 grams/liter as a low VOC limit and is concerned that coatings meeting this limit will not perform adequately. The additional year will provide more time to obtain the needed test data under the Agencies' Test Program. Although not all the testing will be completed by a July 2003 date (to provide enough time to revise the January 1, 2004 limit if needed), a substantial amount will be completed whereby a general performance trend will likely be established. The LADWP will appreciate the opportunity to discuss this test data with you at that time and will discuss any other aspect of the Test Program with you at any time.

13-2

Coatings Manufacturers' Product Data Sheets

The CARB indicated at the March 16, 2000 workshop that it is not in the business of testing coatings. Coating manufacturers recommended that CARB not necessarily rely on product data sheets provided by coatings manufacturers and made the point that some product data sheets can be viewed as sales brochures that present an overly optimistic view of the coating's performance. LADWP supports the coating manufacturers' recommendation and recommends that CARB review the test data from the test program mentioned above.

13-3

Coastal Areas

At the March 16 workshop, the CARB indicated that it is considering a higher IMC VOC limit for equipment located at coastal areas due to the highly corrosive salt air. LADWP supports this proposal and identified this issue in its June 11, 1999 letter to Mr. James E. Nyarady of CARB.

13-4

As stated in the June 11 letter, electric power generating stations are many times located at the ocean to use the ocean water as cooling water in the condensers. The condensers condense steam to liquid water to be pumped back to the boiler that heats the water to high-pressure steam to turn the turbines that turns the electric power

generators. These generating stations have circuit breakers, transformers, voltage regulators, pumps, pipes, turbines, generators, tanks, structural steel, and related equipment that must be protected from corrosion with IMCs.

Quick-Dry IMC Primers

With respect to coating its electrical equipment (e.g., transformers), LADWP's policy is to return electric equipment to service within eight hours after taking it out of service. When the electric equipment is taken out of service to be coated in the field, power is interrupted that creates an inconvenience to residents and an economic burden to industry. LADWP has found that industry does not want its electric power interrupted for more than one-eight hour working shift every ten years because the down-time of its manufacturing plants will adversely impact their businesses. Therefore, LADWP desires to have a low VOC quick-dry primer (it currently uses a high VOC quick-dry primer) whereby it can coat the equipment with the primer, let it cure in a few hours, and be able to apply the top-coat so the equipment can be re-energized within the eight-hour shift. This coating system must then last for ten years.

13-5

The LADWP plans to test primers in the Test Program for their quick-dry characteristics as well as durability. If none pass both of these requirements, LADWP recommends that a higher VOC category be set aside for this application.

If you have any questions or comments, please contact me at (213) 367-0409 or Mr. Timothy L. Conkin at (213) 367-0443.

Sincerely,

Bruce M Moore

BRUCE M. MOORE
Supervisor
Air Quality Business Team

c: Mr. Donald J. Ames, CARB
Mr. James E. Nyarady, CARB
Mr. Michael P. Jaczola, CARB
Mr. Evan Wong, CARB
Ms. Barbara Fry, CARB
Mr. Naveen Berry, SCAQMD

Mr. Timothy L. Conkin

AMERON
Coatings

AMERON COATINGS
Headquarters
201 North Berry Street
P.O. Box 1020 (92822-1020)
Brea, California 92821

Telephone: 714/529-1951
Fax: 714/990-0437

Internet: www.ameroncoatings.com

April 7, 2000

Ms. Janette Brooks, Chief
CALIFORNIA AIR RESOURCES BOARD
Air Quality Measures Branch
Stationary Source Division
P. O. Box 2815
Sacramento, CA 95812

Dear Ms. Brooks:

This letter summarizes comments made at the March 16TH public workshop on the proposed SCM for Architectural Coatings, Draft Impact Environmental Impact Report and provides additional comment on the Industrial Maintenance and Floor Coating categories.

1. Floor Coatings - We were considerably surprised by the change in the Industrial Maintenance Coating definition that excludes Floor Coatings and moves these products to be sold under the Floor Coating category at the substantially lower VOC limit of 100 g/l.

14-1 It is common practice in Industrial Maintenance painting to use the same coating that is specified for the structural steel and concrete walls of any given facility on the floors as well. ARB has already made the determination that 250 g/l is a suitable goal for the Industrial Maintenance category. Since the floors of any given facility are subject to the same environment as the structural steel and concrete walls as well as abrasion, spills and various types of cleaning, one might reasonably argue that service or exposure conditions are more severe for Floor Coatings than for Industrial Maintenance.

In the Environmental Impact Report, Appendix D, Page 41 section Proposed VOC Limit and Basis for Recommendation, the basis for recommending 100 gm/l includes complying market share; however, we believe the survey results do not cover all coatings used under the new definitions. With the exception of 100% solids epoxy surfacers, specifically designed for special chemical flooring, the products we sell for Industrial Maintenance are the same as the products we would sell for the new definition Floor Coatings. We have no accurate way of distinguishing sales in these coatings categories as we do not know if they are being applied to vertical surfaces, horizontal surfaces or both. The survey data from Ameron includes all coatings in the Industrial Maintenance category and not in Floor Coatings. We expect this is true for other respondents in the IM category. Changing these definitions makes the survey data invalid.

The VOC limit for Floor Coatings should be at least as high as the proposed limit for IM Coatings of 250 gm/l or the definitions for Industrial Maintenance Coatings and Floor Coatings should be changed back to the original version.

14-2 Another issue in proposing a 100 g/l limit has previously been raised in our comments on the NTS Study Results for Industrial Maintenance, Section A, Part 2. If this change in definition occurs, these comments are also applicable to floor coatings. Specifically, the issue is the VOC of very high and 100% solids products when tested under Method 24. These products use low molecular weight diluents and resins that are volatile at the Method 24 test temperature of 110°C but not at ambient conditions. As stated in our comments identified above, the two 100% solids epoxies in the NTS Studies do not have 0 VOC under Method 24 and in fact, one product, 1MC13, does not meet the 100 g/l limit proposed. Naval Sea Systems Command (NAVSEA) has also recognized this issue in trying to implement the use of 100% solid products. They are now specifying that the VOC, when tested to Method 24, should be below 150 g/l as the data they have shows this to be a reasonable limit for these products.

14-3 We also do not believe the coatings identified in the Literature Search and cited in the References of Appendix D of the proposed Architectural Coatings SCM are well suited for use in severe service environments. For example, they would not be suitable for rigorous and repeated cleaning with steam as required for floors in food processing industries nor would they have sufficient chemical and corrosion resistance required for long term use in pulp and paper facilities or the chemical process industries. Some case histories of severe service Floor Coatings are attached.

14-4 Another issue relates to citing a raw material supplier as a source for floor coatings. Air Product's "Adura" is an interesting new technology; however, this data comes from a raw materials supplier not a coatings manufacturer. As indicated at the March 16th meeting, information, or so called starting formulas from raw material suppliers, often produce less-than-promised results. Our evaluations indicate that the useful pot-life of this coating is not easily determined; i.e., coatings based on Adura have high gloss over the first two hours of pot-life but begin to loose gloss at some undetermined point thereafter. The end result might be a floor with certain areas having high gloss while other areas might be semigloss or flat.

14-5 2. Economic Impacts Survey - Considerable time was spent developing our response to ARB's Economic Impacts Survey on the proposed Architectural Coatings SCM. The survey was submitted in writing on February 25. The projected costs for compliance were based on an analysis of our High Heat, Metallic Pigmented and Industrial Maintenance product lines as we understood them to be defined in the draft SCM of 12-1-99.

14-5

We received the February 11, 2000 draft SCM on February 25th . This version excluded Floor Coatings from the Industrial Maintenance category. As previously stated, we have no accurate way of distinguishing sales in these coatings categories. We are very disappointed because the data submitted in the Economic Impacts Survey would be invalid if these definitions are changed and we have no data that would allow us to access the impact of these definition changes on our survey response.

14-6

3. Nuclear Coatings - We do not dispute the sales weighted average VOC level of 50 gm/liter, but as already discussed verbally with staff, this category contains many different types of coatings. By far, the largest surface areas in Level 1 and Level 2 containment areas are concrete and these are generally coated with 100% solids products (VOC - 0 by formula calculation method). The steel substrate areas are much smaller and these use higher VOC products. Further, we do not dispute the availability and/or technical feasibility of compliant coating but rather that it is economically unfeasible. This is because of the expensive testing requirements. It cannot be assumed that a product approved in one plant can be used in another. For example, the Design Basis Accident or DBA test simulates a major accident in Level 1 containment areas. The temperature and pressure buildup changes with reactor type and so DBA tests procedures for one site are not appropriate for another site. Further, in repairing an existing coating system with another system requires further testing than just the new system by itself. It is also tested with the existing system. So, if new products are used for the first time in a facility, then testing is usually required. Also, testing has to be done on the substrate the coating system is to be applied to so a system approved on concrete has to be tested on steel if it is to be used in this application. As can be seen, just because there are products available in this category at low VOCs, it does not mean they can be used without further expensive testing. We still believe that because such small quantities are used in California that a Nuclear Category should be added as in the National Rule.

Please feel free to call me at 714/529-1951, Ext. 389 if you have any questions regarding these comments.

Very truly yours,

Norman R. Mowrer
Technical Manager

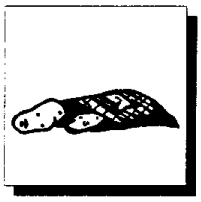
copy: Christine Stanley

Ameron®

Food & Beverage Case Histories

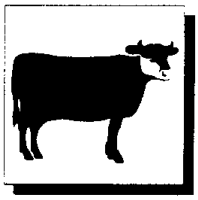
Coffee Packaging

Project	Tote room and seventh floor driers
Owner	Maxwell House
Location	Houston, Texas
Application Date	July 1986
Inspection Date	
Type of Process	Coffee
Area	Drying and packaging
Item/Use	Ceiling concrete/steel
Service	Indoors
Coating/System	Amerlock® 400/Amershield™
Substrate	Concrete/carbon steel
Surface Preparation	Abrasive blast
Application Method	Conventional spray



Potato Processing

Project	Potato plant
Owner	Lamb-Westin
Location	Western Region
Application Date	August 1986
Inspection Date	
Type of Process	Potatoes
Area	Storage remodeled to production
Item/Use	Deck
Service	Indoors
Coating/System	Amerlock 400
Substrate	Carbon steel/galvanized
Surface Preparation	Abrasive blast
Application Method	Airless/conventional spray



Meat Processing

Project	9,000 ft² area
Owner	Hy Plains Beef, Inc.
Location	Dodge City, Kansas
Application Date	1990
Inspection Date	
Type of Process	Meat process
Area	Dressing room
Item/Use	Interior walls
Service	Hose down daily
Coating/System	Amershield
Substrate	Previously coated concrete
Surface Preparation	Clean/roughened
Application Method	Roll

Project	Twin City Foods
Owner	Twin City Foods
Location	Prosser, Washington
Application Date	May 1982
Inspection Date	October, 1982
Type of Process	Potatoes
Area	Waste storage
Item/Use	Tank exterior/interior
Service	Atmospheric/immersion potato waste
Coating/System	Amerlock 400
Substrate	Carbon steel
Surface Preparation	Power tool cleaned
Application Method	

Wineries

Project	Gallo Winery
Owner	Gallo
Location	Livingston, Fresno & Modesto, California
Application Date	1985 and ongoing (May 1988)
Inspection Date	
Type of Process	Wine making
Area	Bottling room
Item/Use	Pipe/tank exteriors (Concrete walls)
Service	Atmospheric/(Interior)
Coating/System	Amerlock 400/(400/Amershield)
Substrate	Steel/(Concrete)
Surface Preparation	Wire brush clean/(Remove loose paint)
Application Method	Airless spray

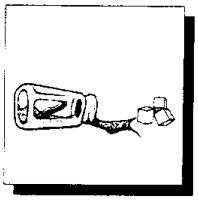
Project	Gallo Winery
Owner	Gallo
Location	Modesto, California
Application Date	June 1988
Inspection Date	
Type of Process	Wine making
Area	Recycling
Item/Use	Sump
Service	Abrasion
Coating/System	Nu-Klad 105/Nu-Klad 100A
Substrate	Concrete
Surface Preparation	Acid etch
Application Method	Spray

Project	Winery
Owner	Acacia
Location	Napa Valley, California
Application Date	February 1989
Inspection Date	
Type of Process	Wine making
Area	Exterior
Item/Use	Structural steel/wood
Service	Atmospheric
Coating/System	Amercoat 220
Substrate	Stainless steel/wood
Surface Preparation	
Application Method	Airless spray
Environment	40 mph winds, 20°F with wind chill factor

Tomato Processing

Project	Hunt Wesson
Owner	Beatrice Foods
Location	Oakdale, California
Application Date	1988
Inspection Date	
Type of Process	Tomato sauce
Area	Near sumps
Item/Use	Exterior conveyors
Service	Atmospheric
Coating/System	Amerlock 400
Substrate	Steel
Surface Preparation	Power tool/wire brush cleaned
Application Method	Conventional spray

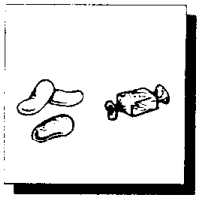
Project	Hunt Wesson
Owner	Beatrice Foods
Location	Oakdale, California
Application Date	1985
Inspection Date	
Type of Process	Tomato sauce
Area	Plant interior
Item/Use	Interior walls/structural steel
Service	Indoors
Coating/System	Amercoat 395 (two coats)
Substrate	Masonry/steel/carbon steel
Surface Preparation	Brush-off blast
Application Method	Conventional spray



Salt/Sugar Processing

Project	Processing plant
Owner	Lesley
Location	Newark, California
Application Date	1982
Inspection Date	
Type of Process	Salt
Area	Drying room
Item/Use	Floors
Service	Abrasion
Coating/System	Nu-Klad 105/Nu-Klad 100
Substrate	Concrete
Surface Preparation	
Application Method	Spray

Project	Processing plant
Owner	Spreckels
Location	Arizona/(Crockett, California)
Application Date	1980/(June 1990)
Inspection Date	1986
Type of Process	Sugar
Area	Manufacturing
Item/Use	Floors
Service	Abrasion
Coating/System	Nu-Klad 105/Nu-Klad 100 (Nu-Klad 120/Amershield)
Substrate	Concrete
Surface Preparation	
Application Method	Spray/(roll)



Candy Factories

Project	Candy factory
Owner	Jelly Belly
Location	Fairfield, California
Application Date	August 1988
Inspection Date	
Type of Process	Jelly beans
Area	Manufacturing
Item/Use	Test wall
Service	Indoors
Coating/System	Amercoat 335
Substrate	Textured sheet rock coated with flat latex
Surface Preparation	Detergent wash
Application Method	Conventional spray

Project	See's Candy - Mansard roof
Owner	See's Candy, Inc.
Location	Honolulu, Hawaii
Application Date	Novembe, 1986
Inspection Date	
Type of Process	Chocolate manufacturing
Area	Exterior
Item/Use	Roof
Service	Atmospheric
Coating/System	Amerlock 400/Amershield
Substrate	Porous
Surface Preparation	Water wash
Application Method	Roll

Project	Candy factory
Owner	Skonza
Location	Oakland, California
Application Date	May 1988
Inspection Date	
Type of Process	Hard candy
Area	Processing areas
Item/Use	Walls/steel pipes
Service	Indoors
Coating/System	Amercoat 335 over existing Waterborne 1-pack epoxy deck paint
Substrate	Steel/masonry/drywall/wood
Surface Preparation	Detergent wash
Application Method	Airless spray/brush/roll

Mushroom Canning

Project	World's largest mushroom processor
Owner	Golden Gourmet Mushroom
Location	San Diego, California
Application Date	July 1990
Inspection Date	
Type of Process	Mushroom farm and canning facility
Area	Processing area
Item/Use	Walls/floors/ceilings
Service	Interior/moisture
Coating/System	Amerlock 400/Amershield
Substrate	Concrete
Surface Preparation	Detergent wash/abrasive blast (floor)
Application Method	Spray/roll

Processing Facility

Project	Processing facility
Owner	General Mills
Location	Chicago, Illinois
Application Date	July 1988
Inspection Date	
Type of Process	Cereals/food stuffs
Area	Processing areas
Item/Use	Structural steel
Service	Indoors
Coating/System	Amerlock 400
Substrate	Steel
Surface Preparation	Detergent wash/mechanical cleaning
Application Method	Spray

Ameron®
Protective Coatings
Group

201 North Berry Street, Brea, California 92622-1020 • J. F. Kennedylaan 7, 4191 MZ Geldermalsen, The Netherlands

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Ameron

Case History

No. 1012

Description
Cafeteria floor

Location
Large midwest university

System
Amerlock 400 and subsequently polished to provide decorative glossy finish and enhance cleanability

Surface Preparation
Detergent/fresh water wash of existing alkyd paint

Date of Application
March 1989

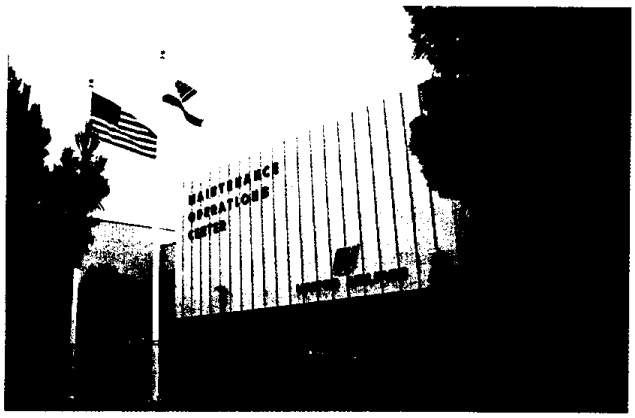
Reference
Ameron's Midwest Office
(708) 377-3070

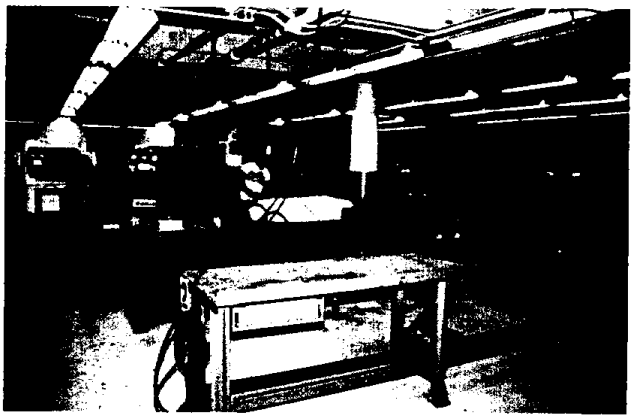
Date of this Report
August 16, 1991

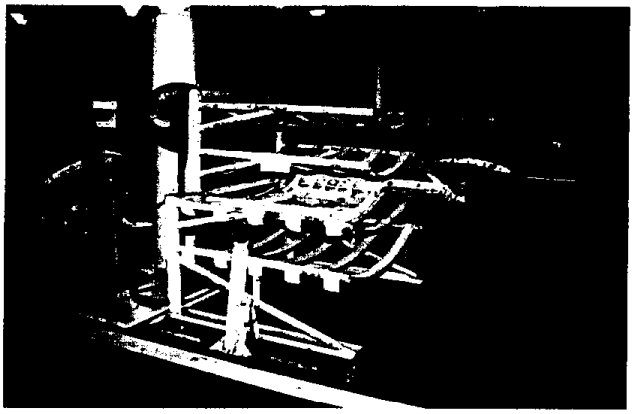
Protective Coatings Division
201 North Berry Street
P.O. Box 2236
Brea, California 92622
(714) 529-1951

Case History

No. 1036





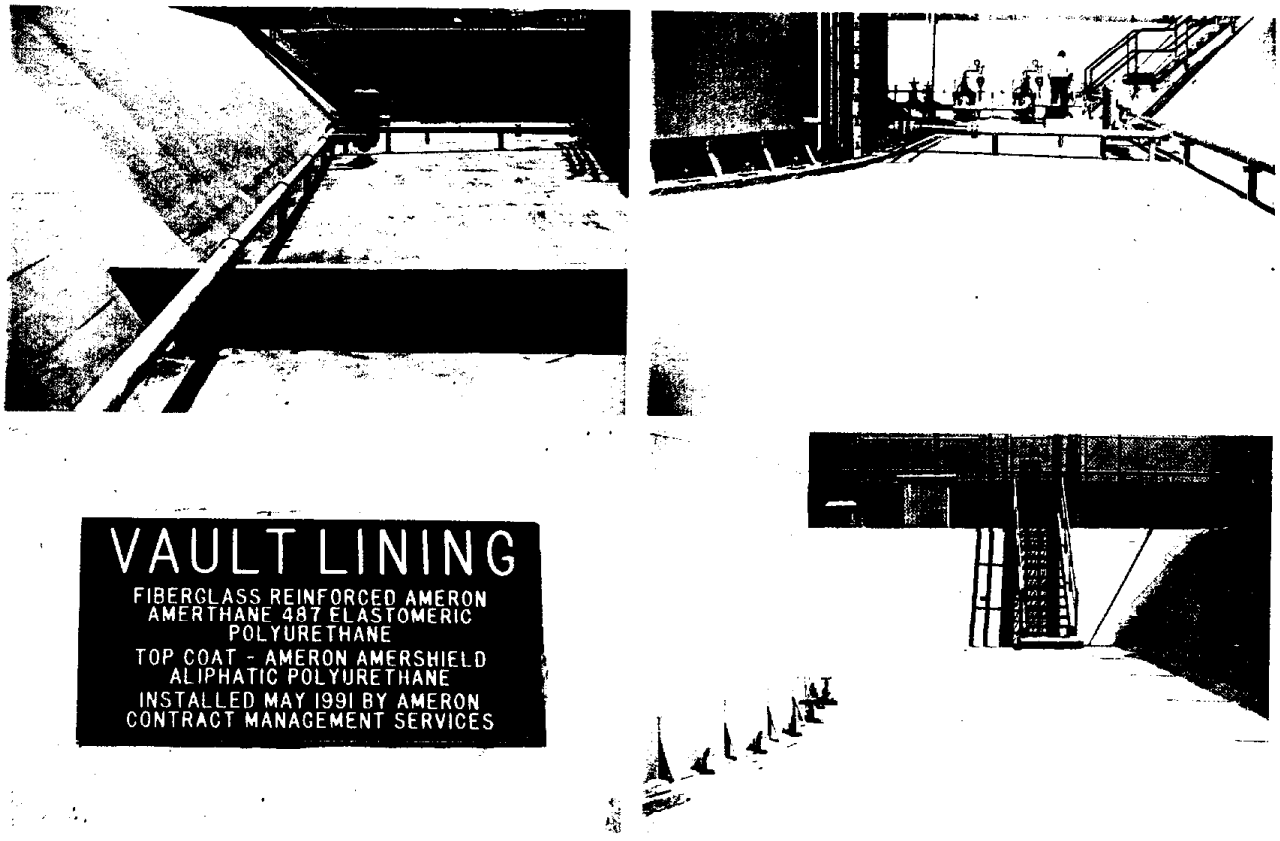


Description	Concrete flooring protection in maintenance shop
Location	United Airline Maintenance Operations Center, San Francisco, California
System	LockShield
Surface Preparation	Rotor blasted on Friday and in service on Monday
Date of Application	September 1989
Reference	Ameron's Concord Office (510) 825-7771
Date of this Report	November 22, 1991

Ameron Protective Coatings Division
201 North Berry Street, P.O. Box 2236
Brea, California 92622 (714) 529-1951

Case History

Ameron **No. 1037**



Description	Vault Lining
Location	IBM Facility, San Jose, California
System	Amerlock 400 primed concrete blocks, fiberglass reinforced Amerthane 487/Amershield
Surface Preparation	Concrete block under layment over existing secondary containment system
Date of Application	May 1991
Reference	Ameron's Western Regional Office (714) 529-1951
Date of this Report	November 22, 1991

Ameron Protective Coatings Division
201 North Berry Street, P.O. Box 2236
Brea, California 92622 (714) 529-1951

Ameron

Case History

No. 1019

Description	Lexus Service Center & Delivery Area
Location	Honolulu, Hawaii
System	LockShield system with sand added to Amershield for non-slip purposes
Surface Preparation	Roto blast
Date of Application	Spring 1989
Reference	Ameron's Honolulu Office (808) 946-6690
Date of this Report	August 19, 1991

Ameron Protective Coatings Division
201 North Berry Street, P.O. Box 2236
Brea, California 92622 (714) 529-1951

Ameron

Case History

No. 1011

Description
Concrete floors, piping, valves, air ducts, railings and other interior metal structures

Location
Grand Gulf Nuclear Power Station, Port Gibson, Mississippi

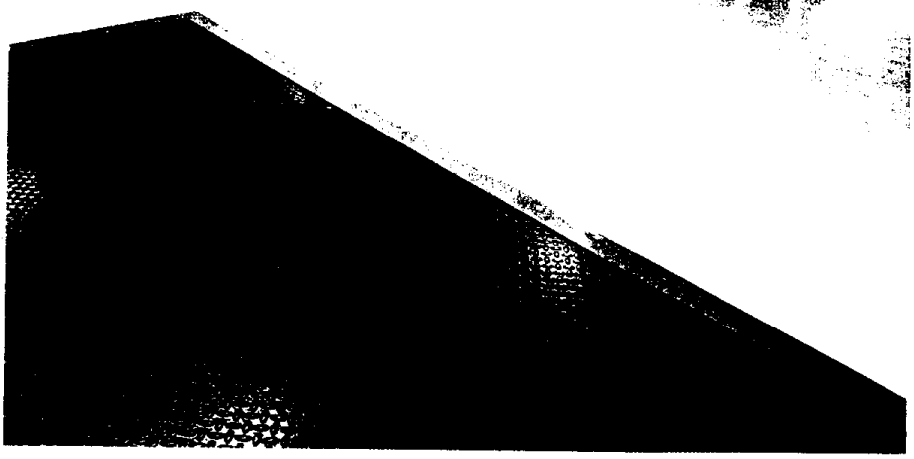
System
Floors - Nu-Klad 110AA/ LockShield system.
Railings, piping, beams, etc. - LockShield system

Surface Preparation
High pressure water wash and spot power tool clean

Date of Application
June 1986

Reference
Ameron's New Orleans Office
(504) 733-9500

Date of this Report
August 16, 1991

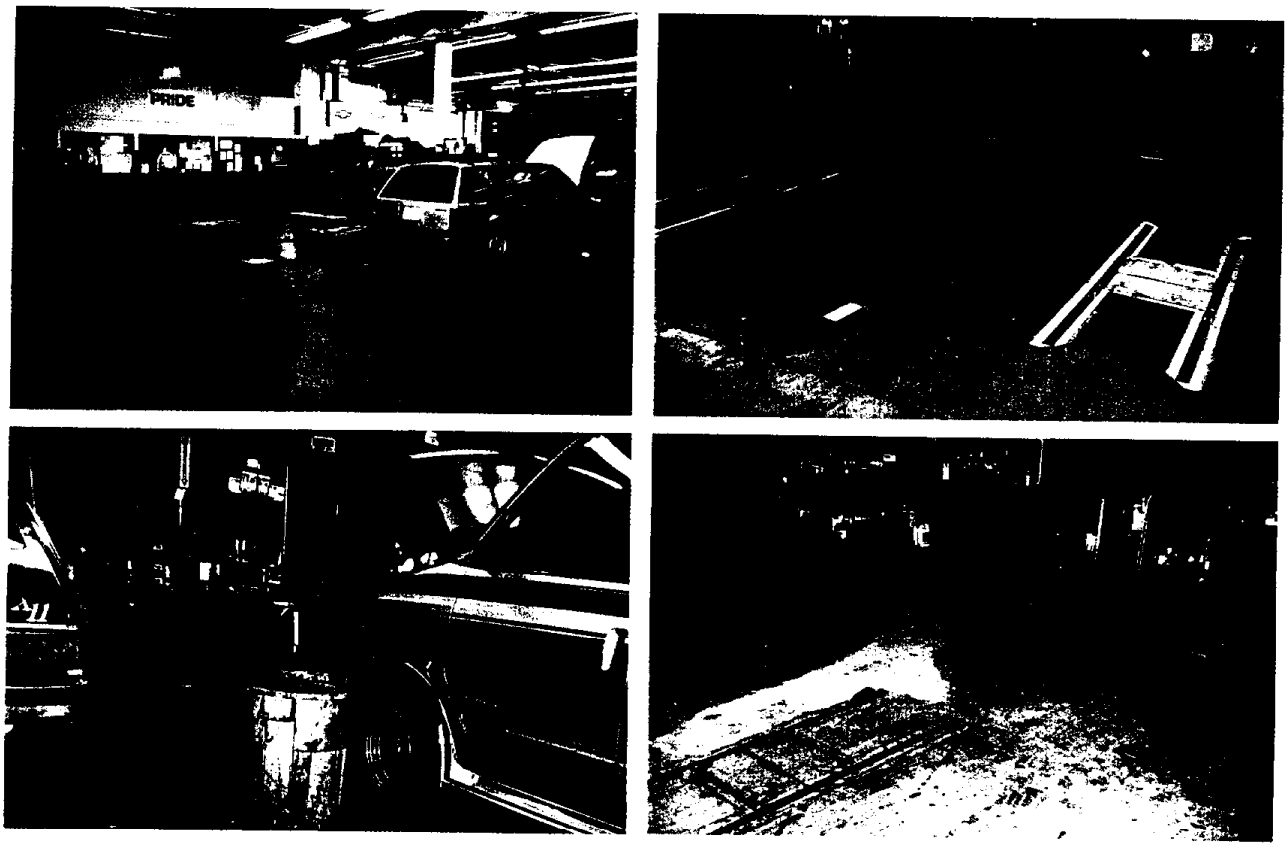


Protective Coatings Division
201 North Berry Street
P.O. Box 2236
Brea, California 92622
(714) 529-1951

Ameron

Case History

No. 1029



Description	Auto dealership service areas, before and one year after application
Location	Major auto dealership in Albuquerque, New Mexico
System	LockShield system
Surface Preparation	Several applications of biodegradable detergent with steam to remove oil and grease, followed by blasting to clean substrate
Date of Application	Spring 1990
Reference	Ameron's Western Regional Office (800) 9-AMERON
Date of this Report	August 22, 1991

Ameron Protective Coatings Division
201 North Berry Street, P.O. Box 2236
Brea, California 92622 (714) 529-1951

CBIZ

Century Business Services

Kessler & Associates Business Services, Inc.
510 11th Street, S.E.
Washington, D.C. 20003
Phone: (202) 547-6808
Fax: [illegible]

VIA FACSIMILE

April 7, 2000

Mr. Jim Nyarady
Manger, Strategy Evaluation Section
Stationary Source Division
California Air Resources Board
2020 L Street
PO Box 2815
Sacramento, California 95812

Re: Draft Program Environmental Impact Report for CARB's Suggested Control Measure for Architectural Coatings

Dear Mr. Nyarady:

Kessler & Associates, Inc., a government affairs firm, represents Dunn-Edwards Corporation ("Dunn-Edwards"), a Los Angeles, California-based manufacturer and seller of quality architectural coatings. Dunn-Edwards submits the following comments regarding the Draft Program Environmental Impact Report ("Draft EIR") for the proposed Suggested Control Measure ("SCM") for Architectural Coatings.

The SCM is an unenforceable guideline which individual Air Quality Management and Air Quality Control Districts may choose to adopt and enforce in the future. (EIR at I-3). The SCM bans architectural coatings with volatile organic compound ("VOC") content higher than the limits set in the SCM.

15-1 Before CARB may validly approve the SCM it must comply with the California Environmental Quality Act ("CEQA"). Cal. Pub. Res. Code § 21000 et seq. CEQA requires, among other things, identification of all potentially significant adverse environmental impacts resulting from CARB's proposed action, Cal. Code Regs. tit. 14 §§ 15126, 15126.2, and steps to mitigate any such adverse impacts. Cal. Pub. Res. Code § 21002.

The Draft Program EIR does not fulfill these CEQA requirements. The Draft EIR contains material factual errors, including improper analysis of statistical and technical data, and misinterpretation of accepted science, as well as questionable policy decisions. As a result of these errors and decisions, the Draft EIR incorrectly concludes that the

SCM will have no adverse environmental impacts. The gravity of this mistake is made more severe by the Draft EIR's decision not to consider the effects of the SCM on a region-by-region basis, as is essential due to the varying effect of VOC reductions on ozone levels in different areas of California.

15-1 In fact, the proposed SCM has the potential to cause significant adverse environmental impacts in various regions of California, while providing virtually no environmental benefit anywhere. The Draft EIR has ignored these adverse consequences and misinformed the public about the true impact of the SCM.

Most importantly, the Draft EIR does not properly evaluate the science of ozone production and destruction. Sound policy dictates that *before* acting, regulators should fully understand the objectives of their actions and the mechanisms they plan to implement to achieve those objectives. In the case of VOC regulation to reduce ozone, this necessary understanding is lacking. In correcting the deficiencies in the Draft EIR, the ARB should follow the findings and recommendations of leading scientists and re-evaluate it's emphasis on statewide VOC controls as the primary tool for reducing ozone.

15-2 CARB should reconsider its approach in light of the conclusions of the National Academy of Sciences that NOx control, *instead* of VOC control, may be the optimal ozone-reduction strategy in some areas.[1] In addition, the Draft EIR should better explain the effect on ozone levels of VOC emission reductions in the presence of varying NOx levels. This should include a detailed examination of NOx transport across California. VOC regulations alone cannot attain the NAAQS, and can be counterproductive if not optimally implemented. Instead, NOx reductions and the control of NOx transportation are crucial.

Because of the complexity of ozone production, varying according to atmospheric conditions, climate, and other factors, VOC control may be ineffective in reducing ozone and, in fact, can *increase ozone levels* in some circumstances.[2] The Draft EIR should comprehensively determine *where* VOC controls will be effective and where they will not, including mapping areas with conditions conducive to negative reactivity. This has not been done. Instead, the Draft EIR assumes that VOC emission reductions are the optimal regulatory strategy in all regions of California. This assumption precludes CARB from understanding the true effects of the SCM, including whether or not the SCM will have an adverse environmental impact. For these reasons, the Draft EIR does not comply with CEQA.

15-3 Dunn-Edwards hopes that its comments will help clear up some of the misinformation in the Draft EIR and provide a sound basis for a revised SCM that achieves the

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[1] National Academy of Sciences, "Rethinking the Ozone Problem in Urban and Regional Air Pollution," (hereinafter "Rethinking Ozone") at 11 (1991).

[2] *See, e.g.*, Rethinking Ozone, at 154-55 (chart showing negative reactivities); A. Russell, et al., "Urban Ozone Control and Atmospheric Reactivity of Organic Gases", Science, July 28, 1995, at 491; William P.L. Carter & Roger Atkinson, "Computer Modeling Study of Incremental Hydrocarbon Reactivity", 23 Envtl. Sci. & Tech. 864 (1989) (chart showing negative reactivities).

complementary goals of improving the environment while at the same time preserving California manufacturers' ability to produce high quality architectural coatings.

CHAPTER I – LEGAL AUTHORITY AND EXECUTIVE SUMMARY

A Program EIR Is Not Properly Tailored to the SCM

An EIR's primary purpose is to inform the ARB, other governmental agencies and the public generally of the environmental impacts of a proposed project. Cal. Code Regs. tit. 14 §15003(c). The lead agency must consider the whole of an action, not simply its constituent parts when determining whether it will have a significant environmental effect. *Id.* §15003(h).

15-4

The California Code of Regulations provides for the use of several types of EIRs, each of which is tailored to different kinds of agency actions. CARB elected to use one such type of specialized EIR for its SCM -- the "Program EIR." A Program EIR is not the appropriate CEQA document for the SCM because it does not present the ARB with technical information necessary to evaluate the potential adverse environmental impacts associated with implementation of the SCM.

The California Code of Regulations sets out in detail the situations in which a Program EIR may be used and the factors to be considered in determining whether to use it. Specifically, a Program EIR may be used where an agency proposes to engage in actions related in certain ways, *id.* § 15168(a) (*i.e.*, geographically, as part of a chain of actions, in connection with the issuance of rules to govern the conduct of a continuing program, or as individual activities having similar environmental effects), and where a Program EIR allows the agency to obtain certain "advantages," *id.* § 15168(b), most importantly, that the Program EIR allow "for a more exhaustive consideration of effects and alternatives than would be practical in a[ ] [Project] EIR." Here, instead of allowing for a more *exhaustive* consideration of the effects of the SCM, the Draft Program EIR analyzes the environmental impacts of the SCM under the assumption that effects on ozone levels will be *qualitatively identical* across airsheds. Its analysis proceeds at a level of generality that *allows it to gloss over the negative environmental impacts of the SCM.* By considering the effects of the SCM on a state-wide basis, the Draft EIR is able to reach the tidy conclusion that if overall VOC emissions will be lowered, ozone levels will fall. These assumptions are incorrect -- the SCM will have different, and sometimes *negative* effects on ozone levels in different areas of California.

The technical analysis of the impacts contained in the Draft EIR is vague and does not address the unique conditions of each of California's 35 air Districts. Perhaps the Draft EIR assumes that each District will prepare its own CEQA analysis if it chooses to adopt the SCM. This assumption fails for two reasons. First, to our knowledge only a few of the 35 districts have ever completed CEQA documentation for rulemaking. Most districts do not have the staff resources or CEQA experience to prepare additional documentation on individual architectural coatings rules.

15-5

Second, the Draft EIR does not present adequate information to inform CARB or the general public of the potential adverse environmental consequences associated with this

SCM. Use of the Program EIR cannot "excuse the lead agency from adequately analyzing reasonably foreseeable significant environmental effects of the project and does not justify deferring such analysis to a later tier EIR or Negative Declaration." *Id.* § 15152(b). The Draft EIR does not include adequate analysis of the significant effects that
15-6 this project may have on air quality and ozone formation throughout California, and it does not hint that there may be negative or even qualitatively different effects on ozone levels in certain regions of the state. These deficiencies render the SCM flawed and the Draft EIR non-compliant with CEQA's express requirements and over-arching purpose.

CHAPTER II – PROJECT DESCRIPTION

Emission Inventory Issues

15-7 Accurate inventories of VOC and NOx emissions are essential to understanding the ozone problem and the effects of a rule like the SCM. By incorrectly assuming that VOC emissions from architectural coatings make up four percent of the overall VOC emissions inventory, (EIR at II-20), the Draft EIR overestimates the necessity for and potential environmental benefits of the SCM. The negligible potential environmental benefits make more important the potential *adverse* environmental effects of the SCM and should cause CARB to re-evaluate the conclusions of the Draft EIR and reconsider the advisability of the SCM.

The SCM and Draft EIR Incorrectly Assume that VOC Content is Equivalent to VOC Emissions

15-8 The Draft EIR states that "the proposed project is essentially a model rule intended to reduce volatile organic compound *emissions* from architectural coatings." (EIR at II-17) (emphasis added). Contrary to the Draft EIR's characterization, this SCM does not regulate VOC emissions, but rather regulates the VOC *content* of architectural coatings.[3] The remainder of Chapter 2 of the Draft EIR and the SCM itself are based on the incorrect assumption that reductions in VOC content necessarily translate into reductions in VOC emissions. Therefore, any expected benefits of the SCM and any projections and conclusions regarding the effect (positive or negative) of the SCM on ozone levels should be re-examined.

The Draft EIR Incorrectly Concludes that there is no Discrepancy Between its VOC Emission Inventory Estimates and Actual VOC Ambient Monitoring

15-9 The Draft EIR attempts to explain away the discrepancy between emission inventory estimates and ambient monitoring data with respect to architectural coatings emissions.

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[3] CARB addresses this assumption in its response to Dunn-Edwards' July 12, 1999 comment on CARB's Initial Study, claiming that it is supported by the use of "Method
15-8 24" which purports to measure VOC emissions from architectural coatings. (EIR Appendix C-4). Dunn-Edwards believes that Method 24 does not accurately measure VOC emissions from coatings under real-world evaporative conditions because Method 24 measures VOCs emitted from coatings when the coatings are heated above the boiling point of water.

The analysis offered, however, is erroneous and otherwise misleading. Contrary to the Draft EIR's implication, the important "source apportionment study," (Fujita, et al.), cited in the Draft EIR does not report that architectural coatings are a major contributor to ambient VOCs in the South Coast Air Basin. Instead, the study concludes that surface coatings *in aggregate* are major contributors. In the study, 93 percent of emissions from surface coatings are attributed to *non-architectural*, "industrial [OEM] coatings," *i.e.*, coatings applied to manufactured articles at a factory or shop. The Draft EIR also misquotes data from the study, saying that this source "specifies that architectural coatings contributed an average of 3.2 to 5.0 percent (at three ARB sites) . . . to the NMHC in Los Angeles." (EIR at II-20). Actually, the range of emissions from
15-9 architectural coatings at those sites is 0.2 to 0.8 percent, with an average of 0.3 percent. (*See* Fujita, et al. at Table 5-1). The percentages given in the Draft EIR were apparently inadvertently taken form a line of data on industrial [OEM] coatings. The Draft EIR later says that industrial coatings "contributed 1.7 to 9.3 percent (ARB sites)," while "other coatings contributed 1.7 to 10 percent . . . ." (EIR at II-20). This is apparently a double misreading of a single line of data given for unidentified hydrocarbons that could not be attributed to any known sources (but are believed to be "secondary organic species produced by photochemical reactions" involving emissions from all sources).

After pointing out that the architectural coatings speciation profile used in the study was derived solely from solventborne coatings, *id.*, the Draft EIR "concludes that because waterborne coatings make up roughly 80 percent of the inventory [for architectural coatings], and assuming the solventborne coatings make up an average of one percent of the inventory in the source apportionment study, the real percentage of the architectural coatings inventory in the source apportionment can be estimated to be four percent. This is the same number as the ARB reports in its emission inventory." (*Id.*) The actual average percentage attributed to architectural coatings (across all monitoring sites and times) in the source apportionment study, however, is not one percent but rather 0.25 percent. (*See* Fujita, et al. at Tables V-1, V-2, V-3, and V-4). And the Draft EIR later admits that "82 percent of [architectural] coatings used in California are waterborne, yet waterborne coatings account for only 33 percent of the total emissions [from architectural coatings]. (EIR at IV-74). Conversely, while only 18 percent of total sales are solventborne coatings, they account for 67 percent of the emissions." Re-doing the calculation with the correct numbers, therefore, would give 0.25 percent divided by 67 percent, which equals 0.37 percent, or less than one-tenth the number ARB assigns architectural coatings in its emission inventory. This significant discrepancy raises questions as to whether architectural coatings make any significant contribution to air pollution, and whether any further regulation of architectural coatings is warranted -- much less the drastic reductions of the proposed SCM.

The Draft EIR Mischaracterizes the Likely Reductions in VOC Emissions Absent the SCM

15-10

CARB's justification for the SCM is the supposed need to reduce VOC emissions from architectural coatings -- reductions estimated to be 11.3 tons per day if adopted state-wide. (EIR Table II-3). The Draft EIR's own statistics, however, demonstrate that regulation is not necessary to achieve this goal. *Id.*

First, the Draft EIR incorrectly asserts that "[f]or the most part, California districts will not see additional emission reductions from the national rule, since the majority of the national limits are equal to or higher than the districts' limits." (EIR at II-18). Currently, only approximately one-half of California's 35 air districts have adopted limits more stringent than EPA's national architectural coating rule. All other districts must comply with the national rule and so will achieve the attendant VOC emissions reductions.

15-10

Second, the Draft EIR indicates that from 1990 through 1996 -- a period in which no significant new architectural coatings rules or amendments to pre-existing rules were put into effect in California -- VOC emissions from architectural coatings fell from 126 tons per day to 117 tons per day. (EIR Table II-1). This translates into a reduction of seven percent for that time period or 1.2 percent per year. Assuming the same rate of reduction (absent any further regulation), for the seven year period from 1996 to 2003 (the date of implementation for the SCM),[4] VOC emissions from architectural coatings would fall a further 8.4 tons -- *almost the entire amount targeted by the SCM.* This directly contradicts the Draft EIR's assumption that "without additional architectural coatings regulations, the inventory for architectural coatings emissions will increase due to population growth." (*Id.* at III-36). The internal inconsistency of the Draft EIR on such a crucial point demonstrates the need for further consideration of the SCM and its projected environmental impacts.

The VOC Limits in the SCM Are Not Technologically Feasible

In an effort to demonstrate that the SCM's VOC limits (set out in Table II-3) are technologically feasible, the Draft EIR relies heavily on the ARB survey of 1996

15-11

architectural coatings and the NTS study of architectural coatings performance (commissioned by the South Coast Air Quality Management District ("SCAQMD")). (EIR at II-23 to II-27). In particular, the Draft EIR's conclusion that the SCM VOC content limits are feasible is based primarily on the fact that there are some currently-available coatings within each coating category that comply with the proposed limits; therefore, these low VOC coatings can adequately perform the full range of applications required of coatings within their coating category. The Draft EIR's logic is flawed and the survey and study (whether considered separately or in conjunction) do not provide adequate basis for rule development, nor any justification specifically for the proposed SCM.

With respect to data on the various coating categories, the 1996 survey is flawed because many coatings were miscategorized by respondents, for a number of reasons. In some cases, manufacturers were simply unfamiliar with the definition and rationale for a given

15-12

category. For example, a large volume of waterborne primers, sealers and undercoaters was miscategorized as "Quick-Dry Primers, Sealers & Undercoaters" based on the dry-time included in the definition of that category.[5] In other cases, confusion was generated

[4] This emission reduction trend can be expected to continue, even in the absence of further regulation, since it is consistent with the long-term, market-driven trend toward lower cost coatings, which are often low-VOC coatings.

15-10

[5] Waterborne coatings will generally meet the dry-time requirement under favorable (warm and dry) conditions, although such products are not marketed as "quick-dry"

15-12

by including in the survey form approximately 20 categories defined in U.S. EPA's new national rule for architectural coatings, but not found in any of the current local district rules in California. Some manufacturers classified products into the national rule
15-12 categories, while others reported similar products only in the categories under which those products are marketed in California.

Even had all products been correctly categorized, however, the survey still fails to provide reliable guidance on appropriate VOC content limits, because the survey collected no performance data on the coatings subsumed under each category. The arbitrary breadth of the major coating categories results in aggregation of many coatings that differ widely in composition, specific intended use, performance characteristics, and VOC content. As the basis for its conclusion that the SCM's VOC limits are feasible the Draft EIR appears to assume that all coatings within a category are interchangeable. In fact, the various products within a category are not interchangeable. In general, coatings at the lower end of the VOC content range are not adequate substitutes for all coatings at the higher end. Specific examples of technologically infeasible limits included in the SCM include:

- *Non-flat Coatings* (150 g/L VOC): Coatings exist at or below this level; however, the coatings with best durability and resistance to deterioration by water, corrosion, physical contact, loss of adhesion, erosion, film cracking, discoloration, household chemical attack and the effects of infrared and ultraviolet radiation of sunlight require "hard " resins which must be formulated at >200 g/L to achieve maximum performance. Resins cited in the NTS study for Rohm & Haas, BASF,
15-13 Vianova designed to form films at low VOC levels at best show good block resistance.

  The discussion of non-flat coatings in Appendix D is misleading. The NTS study states that flow and leveling characteristics are superior for existing alkyd paints (>350 g/L VOC) compared with any water base products (150-250 g/L VOC). Furthermore, the <150g/L coatings discussed on page 15 of Appendix D are not at the highest performance levels achievable. The qualities cited on pages 16-17 of Appendix D are marketing terms-of-art used by manufacturers to de-emphasize the compromises made necessary by excessively stringent VOC content limits -- hardly a guarantee of the ultimate of performance.

- *Primer, Sealers and Undercoaters* (200 g/L VOC): Coatings exist at or below this level; however, the surface to be prepared and coated and/or top-coated, and the exposure conditions must be considered. Alkyd based systems at >350 g/L
15-14 are more forgiving if the surface is less than perfectly prepared, *e.g.*, wood prone to bleed thru, rusty metal, and chalky surfaces. Products <200 g/L VOC are satisfactory, in most cases, only when a very clean, uncompromised surface is available. This is seldom the case in most architectural repaint situations. Some substrates (metals, plastics, man-made materials) are so difficult to properly adhere to that special latex resins need the use of >200 g/L VOC coatings.

15-12 coatings because they cannot meet the dry-time requirement under adverse (cool and wet) conditions.

15-14 General alkyd based wood primers need at least 380 g/L to effectively protect natural wood surfaces. Alkyd and other solvent borne primers, sealers and undercoaters for man-made synthetic woods and other composite building materials may need >400 g/L coatings because of their unique surface chemistries and physical profiles which are difficult to adhere to.

15-15
- *Industrial Maintenance Coatings* (250 g/L VOC). Coatings exist at or below this level; however, this category is too broad to have a single VOC standard for all of the types of resin systems, surfaces and conditions where industrial maintenance coatings are used. Each surface requires a specific coating to achieve the cost of coverage per year of service desired. For example, two component epoxy systems are available at <250 g/L VOC are totally adequate for tank linings or cement coatings but for ultimate resistance the ultraviolet degradation and ease of application a single component polyurethane at >250 g/L VOC is the best choice.

15-16 As discussed at pages 10-14, below, using inadequate substitutes would be environmentally counterproductive because more coating material will be applied on each job; more thinning solvents will be added to coatings; and more frequent re-coating will be necessary; therefore, more paint will be used and more VOCs emitted.

15-17 The Draft EIR's erroneous analysis is exacerbated by the fact that a large percentage of the projected emissions reductions come from the industrial maintenance and quick-dry primers, sealers, and undercoaters categories -- categories for which compliant coatings comprise only 28% and 34.6% of the total market respectively. Therefore, the Draft EIR's assumption that existing compliant coatings perform adequately to replace all existing higher-VOC coatings is particularly doubtful for these categories.

15-18 The Draft EIR also relies on the NTS study, which may yet provide relevant performance data on coatings in certain categories -- when all three phases of the study are complete: laboratory testing; field-application studies; and long-term exposure studies. To date, only the first-phase, laboratory testing, is finished, although the preliminary data is still undergoing QA/QC review. The Draft EIR, however, mischaracterizes the preliminary results of the study, saying they "show that when compared to conventional, currently compliant coatings, low-VOC coatings available today have similar application and performance characteristics, including blocking resistance, mar resistance, adhesion, abrasion resistance, and corrosion protection." (EIR at II-26). In fact, the results show that while a given low-VOC alternative may have similar blocking resistance, and another might have similar adhesion or abrasion resistance, and so on, all such products are deficient in other characteristics. Simply put, the low-VOC alternatives are less adequate when examined in terms of the total constellation of performance characteristics that coating formulators seek to optimize. (See enclosed article, "Novel Approach to Formulation Modeling," European Coatings Journal, Jan/Feb 2000).

CHAPTER III – EXISTING SETTING

Impacts on Air Quality

15-19 The Draft EIR's description of ozone formation is oversimplified and misleading. Ozone formation is dependent on a number of factors and variables. Among the factors not adequately addressed in the Draft EIR is the role in ozone formation of NOx levels and the widespread NOx transport throughout California -- issues crucial to determining the environmental effects of VOC emission reductions.

Furthermore, the Draft EIR incorrectly implies that VOCs always contribute to ozone formation. To avoid this mistake, the Draft EIR should explain in greater detail the roles in ozone formation of NOx, VOCs, and other atmospheric factors. This analysis should be performed for various atmospheric conditions representing the various conditions present in California at various times of the year.

Other Potential Adverse Impacts of the SCM

15-20 ***Water supply***: Water delivery systems in California are painted with a coating that is intended to last several years. If the integrity of these coatings is reduced, repainting at significant costs will be needed. The ability to pay for this is questionable, with the degradation of the delivery systems being negatively impacted.

15-21 ***Discharges to POTWs/Solid Waste***: Increased painting caused by the need to re-paint more frequently, as a result of decreased coating quality, will place additional strains on the municipal wastewater treatment facilities and landfills.

15-22 ***Schools***: School budgets (and child safety) will be adversely impacted. The cost of more frequent repainting may be prohibitive, causing some structures to degrade. This may place children in structures that are not as sound as they otherwise would be.

15-23 ***Public Health and Safety***: Replacing commonly used solvents through reformulation will lead to increased hazards. For example, acetone is touted as a replacement solvent, although it is a hazard to the typical homeowner (see page 16, below). Although other VOCs currently used have some degree of hazard, coatings containing the most dangerous VOCs are typically handled only by trained contractors, not homeowners. This will change under the new SCM, which will force new and unproven technology into the do-it-yourselfer market.

The Draft EIR Does Not Adequately Take Into Account Regional/Climatic Factors

15-24 The various climates of California, (*see, e.g.*, EIR at III-32 to III-41), cry out for a more sophisticated approach than the one-size-fits-all approach currently proposed. The SCM has the potential to cause different effects in each region of California. Biogenic VOCs play an important role in some areas, but not others. Negative reactivity may occur in some areas, but not others. To adequately describe the existing setting, the Draft EIR

should describe each separate airshed and how the SCM will impact each on a seasonal basis. This analysis would show that architectural coatings regulations are not necessary in many regions, and expose the falsity of the Draft EIR's assumption that the SCM will reduce ozone levels across all of California. The generalities offered by the Draft EIR in do not describe the effects of the SCM and are not consistent with CEQA's primary
15-24 requirement to examine, identify, and mitigate adverse environmental impacts caused by the SCM.

The differences in climate also underscore the need for coatings able to withstand extreme climatic conditions, including heat, cold, humidity, rain, and pollution. The Draft EIR contains no discussion regarding the ability of currently-available compliant coatings to perform in these conditions -- yet another shortcoming of the Draft EIR's evaluation of the technological feasibility of the SCM's proposed limits.

CHAPTER IV – ENVIRONMENTAL IMPACTS AND MITIGATION

Air Quality

The Draft EIR nowhere estimates the SCM's actual effect on ozone levels. This is probably because the 11.3 tons per day VOC reduction contemplated by the SCM, even if
15-25 achieved, will have virtually *no* effect on ozone levels. To portray the SCM as effective and substantial, the Draft EIR attempts to justify it by indicating the absolute tonnage reduction and the percentage reduction from existing architectural coatings VOC emissions levels. (*See* EIR Table II-1). Although this indicates the SCM could substantially reduce the percentage content of VOCs in architectural coatings (with extremely high attendant costs for manufacturers and consumers), the Draft EIR's analysis does not indicate what percentage of the overall VOC emission inventory will be reduced by the SCM. In fact, according to the Draft EIR's own numbers, the 11.3 tons/day decrease represents a miniscule 0.3% decrease in the overall anthropogenic VOC emission inventory.[6] Contrast the Draft EIR's approach in evaluating whether the SCM will have a substantial adverse environmental impact, whereby it repeatedly analyzes not the absolute impact on waste disposal, landfill space, water quality, or other adverse environmental impacts resulting from the SCM, but rather the percentage increase as compared with the total. (*See, e.g.* Table IV-7, Table IV-9, Table IV-11, Table IV-12). By using different metrics, the Draft EIR is able to characterize the benefits of the SCM as large and the adverse impacts as small, thereby blurring the issues and misleading readers. the Draft EIR should use an "apples to apples" comparison of environmental costs and benefits, using a consistent metric for both.

Analysis of "Industry Issues"

Pages IV-61 through IV-80 address a number of issues bringing into doubt the Draft
15-26 EIR's conclusion that VOC content limits will result in an overall decrease in emission from architectural coatings. Over the past, industry has many times raised these issues, commonly referred to as the "Seven Deadly Sins." These issues suggest that stringent

15-25 [6] The overall VOC inventory is reported to be 3200 tons per day. (EIR at II-19).

regulations like the SCM will lead to substitution of less adequate coatings that require more coats, more priming, more frequent recoating, more touch-ups, and more thinning, to cover the same area for the same period of time as a higher-VOC coating; therefore, more paint is needed to do the same job and more VOCs are emitted They also suggest that because the VOCs commonly found in low-VOC coatings often have higher reactivities than the most prevalent VOCs in higher-VOC coatings, regulations limiting
15-26 the mass content of VOCs may actually result in increased ozone.

the Draft EIR's response to these issues is inadequate. First, the Draft EIR repeatedly misstates industry's position in important ways. Second, the Draft EIR can point to no study supporting its positions. Instead, the Draft EIR's arguments rest on (EIR at IV-61): (1) the partially completed NTS study, which has to date yielded no field-application or long-term exposure information on low-VOC coatings; (2) sales volume information; and (3) product data sheets, which are little more than marketing materials produced by manufacturers to sing the praises of their own products. None of these is a substitute for a proper analysis of issues raised by industry repeatedly for years, on issues that bear directly on whether mass-based VOC regulations are at all effective, or whether they actually harm the environment.

More Thickness

Contrary to the Draft EIR's characterization, industry representatives did not "contend that low-VOC waterborne" coatings tend to produce thicker films. This issue was raised primarily with respect to low-VOC high-solids solventborne alkyd coatings, particularly
15-27 Nonflats. This impact also occurs with two-component high-build Industrial Maintenance Coatings, which are purposely formulated to produce thicker films, typically five to ten times as thick as conventional coatings. The Draft EIR's misstatement of industry's position allowed the it to include data on waterborne coatings in its analysis. By diluting data on the categories of concern with data from many other categories, the Draft EIR was able to conclude that there is not necessarily a relationship between low-VOC levels, thickness, solids, and coverage. Moreover, the Draft EIR does not appear to note that coverage rates are a function of coating solids by volume and dry film thickness, which relates to coating viscosity and application method. Low-VOC high-solids solventborne alkyd coatings typically have high viscosity, and when applied by brush, roller, or spray (unthinned) will tend to produce significantly thicker films than conventional coatings, thus increasing VOC emissions per unit of area covered. The Draft EIR does not analyze this impact.

More Thinning

15-28 the Draft EIR once again mischaracterizes manufacturers' position. Manufacturers did not assert "that thinning occurs . . . in low VOC waterborne" coatings, (EIR at IV-65), but rather in the same types of coatings that would tend to produce more thickness unless thinned in the field beyond manufacturers' recommendations. Coverage rates shown in Table IV-2 are taken from product labels or data sheets, which generally indicate theoretical coverage at the recommended dry film thickness, although actual dry film thickness may vary substantially as applied.

In addition, CARB's 1991 field study of thinning practices cited in the Draft EIR is seriously flawed. In the study, 121 coatings "were observed being applied" but only 49 were sampled and analyzed for VOC content. Of those 49, 18 were waterborne coatings that would be thinned only with water, not VOC solvents. Four of the remaining 31 solventborne coatings (*i.e.* 13%) had apparently been thinned in excess of applicable limits. Furthermore, the field work in the study was performed by local district enforcement personnel, with authority to issue notices of violation that could result in heavy fines. Many of the painting contractors questioned in the study later admitted to being intimidated by the enforcement officers and therefore were reluctant to disclose actual field-thinning practices. In addition, the study focused on relatively higher-VOC content specialty coatings that are less likely to be thinned than lower-VOC general purpose coatings.

15-29

More Priming

This issue was raised specifically with reference to the increasing use of low-VOC waterborne latex enamels on difficult substrates, including previously enameled surfaces. Such products have demonstrably poorer adhesion than solventborne alkyd enamels, which will adhere adequately to previously enameled surfaces. As a general precaution, it is generally recommended that difficult substrates to be topcoated with latex enamel first be primed, with either solventborne or waterborne primers. Such priming would be unnecessary with a better adhering alkyd enamel. Also, the Draft EIR does not address an additional cause of more priming, namely the relatively poor sealing and stain-blocking properties of waterborne primers.

15-30

More Topcoats

Contrary to the Draft EIR's statement, manufacturers and contractors do not "assert that low-VOC solventborne topcoats may not cover, build . . . or flow-and-level . . . as well as higher-VOC solventborne formulations," (*id.* at IV-68), but rather that waterborne latex topcoats exhibit deficiencies is these areas. Reliance on the preliminary laboratory data from the NTS study is particularly misguided because one of the major flaws of this portion of the study was that all testing panels were prepared by the "drawdown" method (in which a puddle of paint is wiped across the panel surface with a special tool) rather than typical real-world application methods such as brush, roller, or spray. The Draft EIR's assessment of coatings technology "breakthroughs" is unrealistically optimistic, and is not supported by industry experience. The Draft EIR's reliance on the Ventura County Air Pollution Control District ("APCD") study is also misplaced. Paint manufacturers and contractors strongly disagree with the conclusions of the study. The study was severely limited in:

15-31

(1) *The number and type of applications of each product tested*: The study was generally limited to one applications of the waterborne coatings tested, and the specific applications selected avoid the conditions most associated with failure of waterborne coatings, for example: application of latex enamel over surfaces previously enameled with high-gloss alkyd enamel; application of exterior latex

primer and/or enamel over chalky, oxidized substrates; application of interior latex primer and/or enamel to substrates contaminated with residues of oil, grease, or wax; and application of latex sealer to surfaces marked with water soluble stains. Also, none of the coatings tested were subjected to the range of extreme exposure conditions that Industrial Maintenance Coatings are formulated to resist;

15-31 (2) *The timeframe of the tests*: The six month timeframe of the testing project was far too limited to allow for evaluation of long-term durability of the substitute products as compared to higher-VOC products. Durability is the single factor most related to frequency of repainting; and

(3) *The range of products tested*: The study tested almost exclusively waterborne coatings that might be used as substitutes for higher-VOC Quick-dry Enamels, Quick-dry Primers, Industrial Maintenance Coatings, and Lacquer Coatings, the performance problems of which are of a different nature than those associated with complying solventborne coatings that are often the preferred substitute.

More Touch-ups and Repair Work

Manufacturers and contractors do not "assert that waterborne . . . formulations dry slowly and are susceptible to damage such as sagging, wrinkling, alligatoring . . . or becoming 15-32 scraped or scratched." These problems were noted with regard to low-VOC high-solids solventborne alkyd enamels. Moreover, as indicated above, the Draft EIR's reliance on manufacturer-produced marketing materials cannot substitute for scientific technical analysis. The preliminary laboratory data from the NTS study is also inadequate for evaluating the coating deficiencies that result in more touch-ups and repair work under real-world application conditions.

More Frequent Recoating

The preliminary laboratory testing phase of the NTS study, the basis of the Draft EIR's conclusions regarding the durability of low-VOC coatings, was never intended to address the long-term performance issues that relate to more frequent recoating. This is precisely why the NTS study also includes a long-term exposure study phase, which has yet to be initiated. Moreover, coating durability is not simply a question of high-VOC versus low-VOC products. Different types of coatings, formulated from a wide variety of resins, 15-33 solvents, and other components, characteristically have different levels of VOC content and correspondingly different sets of performance attributes, which make them suitable for different purposes. Coatings that typically have lower VOC content may be fully adequate for certain uses, and yet be utterly inadequate as substitutes for coatings that might be banned on the basis of their higher VOC content. Therefore, while VOC content is not the sole determinant of coating performance, some optimum amount of VOC is necessary to achieve maximum performance in any given type of coating. If a VOC content limit is set below the optimum amount for a particular coating use -- as the proposed SCM would require-- performance is impaired because the best coatings of that type would be banned. When the performance of available substitutes is inadequate, service life is shortened and frequency of recoating is increased. The Draft EIR makes no

attempt to analyze this issue by identifying specifically which coatings would be banned by the proposed limits, what the likely substitutes would be, and their respective performance characteristics.

Substitution of Higher VOC Alternatives

The tremendous variety of architectural coatings available today exists because of market demand for cost-effective solutions to specific performance needs. When a VOC content limit bans the best performing coatings in a given category, substitutes are likely to come
15-34 from another category, which may have a higher VOC content limit, thereby circumventing the regulation and eliminating VOC the projected emissions reductions. The nature of markets is to seek the greatest value (maximum performance at minimum cost) from the widest possible range of options. The Draft EIR makes no attempt to analyze factors that will determine substitute product selection within the context of all remaining architectural coatings after implementation of the proposed SCM. Instead, the Draft EIR incorrectly assumes that the level of usage of each category will remain constant.

Reactivity

The Draft EIR admits that "[d]ifferent types of [VOC]s have different degrees of 'reactivity,' which refers to a compound's ability to accelerate the formation of ground-
15-35 level ozone." (EIR at IV-73). The Draft EIR even acknowledges the existence of "negative reactivity," whereby VOC emissions *suppress* ozone formation under certain conditions. (*Id.* at IV-79). Reactivity and negative reactivity are dependent on factors including the VOC emitted, the presence of NOx, atmospheric conditions, and climate.[7] What the Draft EIR does not do is comprehensively determine the effects of VOC emission reductions across the air districts of California. Instead, the Draft EIR ignores differences in reactivity among VOCs, airsheds, and seasons, to incorrectly conclude that the SCM will not lead to substitution of more reactive VOCs, and that it will not cause increases in ozone levels because of negative reactivity.

The Draft EIR first argues that although propylene glycol (a primary VOC in waterborne coatings) is two to three times more reactive than "a typical mineral spirit used in solventborne coatings," it is less reactive than some VOCs used in solventborne coatings,
15-36 such as toluene and xylenes; therefore, its increased use should not increase ozone levels. (*Id.* at IV-73). But the Draft EIR does not mention that mineral spirits compose *80%* of VOCs in solventborne coatings, whereas toluene and xylenes comprise only 4.2%.[8] Therefore, even a significantly smaller volume of propylene glycol in waterborne coatings than mineral spirits in solventborne coatings will have the effect of *increasing* ozone levels due to propylene glycol's higher reactivity.

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[7] *See, e.g.* "Rethinking Ozone" at 116, 154.

[8] Harley, et al. "Respeciation of Organic Gas Emissions and the Detection of Excess Unburned Gasoline in the Atmosphere," 25 Environ. Sci. Technol. 2395, 2398 (1992).

15-37

The draft EIR's comparison of the reactivities of waterborne versus solventborne coatings misstates the nature of the issue. The real issue is whether a probable waterborne substitute for a solventborne product will have equal or greater ozone formation impacts, accounting for differences in both VOC content and VOC reactivity. The comparison given in the draft EIR, contrary to claims made, does not provide "strong evidence that reformulating from solventborne to waterborne coatings to reduce total VOC content is an effective strategy to reduce the ozone formation potential" of architectural coatings. (EIR at IV-73 to IV-74). This is because the comparison deals with currently available coatings in a few categories that include large volumes of low-VOC waterborne coatings intended for specific end-uses within each category, but not intended as substitutes for solventborne coatings formulated for different purposes. For example, the Primer, Sealer & Undercoater category includes a large volume of low-VOC waterborne latex drywall sealer, as well as smaller volumes of high-VOC solventborne specialty primers intended for difficult substrates such as metal, glass, plastic, fiberglass, and surfaces contaminated with oil and grease or high alkalinity. The waterborne coatings in this category have an average actual VOC content of 41 grams per liter (according to the ARB survey of 1996 coatings) and the solventborne coatings have an average actual VOC content of 345 grams per liter. This eightfold difference in average VOC content overwhelms any potential difference in VOC reactivity in the draft EIR's calculations. Several crucial facts, however, are omitted.

First, the average waterborne latex sealer is not a suitable replacement for solventborne specialty products. If a waterborne substitute were to be specially formulated, its VOC content would likely be at or near the proposed VOC content limit of 200 grams per liter. (In fact, projected emission reductions are calculated on the assumption that products with VOC contents above the applicable limit will be replaced by coatings formulated at the limit.) Second, solventborne coatings typically have solids content that is 1.5 to 2 times greater (by volume) than waterborne coatings, which means that it takes 1.5 to 2 gallons of waterborne coating to replace one gallon of solventborne product. Finally, most solventborne products contain only mineral spirits, and waterborne products typically contain glycol compounds as the principal cosolvent. Thus, if glycol compounds are assumed to be "two to three times more reactive than a typical mineral spirit," the waterborne replacement at 200 grams per liter could have as much as 1.74 times more ozone formation potential than the solventborne product at 345 grams per liter.

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Finally, the Draft EIR suggests that recent work by Dr. Carter indicates that some mineral spirits may be more reactive than previously thought. (EIR at IV-74). The Study cited by the Draft EIR, however, discusses *computer modeled* estimated reactivities for certain mineral spirits. These findings conflict with Dr. Carter's direct air chamber reactivity measurements for mineral spirits, which demonstrate that mineral spirits are either negatively reactive or cause "essentially no change in the final [ozone] levels."[9]

[9] William P.L. Carter, et al., "Investigation of the Atmospheric Ozone Forming Potentials of Selected Mineral Spirits Samples," at 37-38 (1997).

Negative Reactivity

15-39 The Draft EIR acknowledges that VOC emissions can reduce ozone levels (*i.e.* VOCs are "negatively reactive") under certain conditions, *(id.* at IV-79), but nowhere indicates when, where, or how often those conditions occur in California. The Draft EIR does note (without citation or support) that negative reactivity is not "commonly" found in "ozone *non-attainment urban* areas," (*id.*), but makes no statement regarding negative reactivity in *all other areas of California --the vast majority of the state*. Absent a full analysis of the conditions under which negative reactivity occurs and the prevalence of those conditions in California on a regional basis, the Draft EIR cannot know whether the SCM will result in increased ozone levels.

The Effectiveness of Mass-Based Controls for Reducing Ozone

15-40 The Draft EIR reasons that because mass-based VOC control strategies have been somewhat effective in the past, they are the preferred alternative for the SCM. In the sweeping evaluation of the success of all past regulation in the aggregate, the Draft EIR makes no effort to distinguish the effectiveness of mass-based architectural VOC control strategies from mass-based mobile source control strategies or any other control strategies. This omission is crucial, especially given that different sources emit different VOCs which have different effects on ozone levels. Some VOCs can cause up to an order of magnitude more ozone than others,[10] and some VOCs are negatively reactive. The mass-based SCM "do[es] not selectively remove VOCs" through its regulation, (EIR at IV-79); therefore, CARB does not know whether its stringent VOC limits will cause the removal of highly reactive, negligibly reactive, or negatively reactive VOCs or whether coatings will be reformulated with more reactive VOCs, thereby increasing ozone levels. The Draft EIR's one paragraph discussion supporting the SCM's mass-based approach is sorely lacking.

Health and Safety

15-41 It is anticipated that the SCM will result in substitution of acetone (an exempt solvent) for other VOCs in architectural coatings. According to a recently published evaluation of the hazard potential of solvents, acetone was found to be 25 times more hazardous than mineral spirits. *See* enclosed article on "Systematic Evaluation of the Hazard Potential of Solvents," Paint & Coatings Industry Magazine, March 2000. Nonetheless, in assessing the health and safety risks of using acetone as an exempt solvent in architectural coatings, the Draft EIR concludes that "[p]otential hazards impacts resulting from implementing the SCM are not expected to be significant" because the "increased use of acetone will generally be balanced by reduced usage of other equally or more hazardous materials such as MEK, toluene, xylenes, etc." (EIR at IV-107). Contrary to the Draft EIR's characterization, however, if the SCM's VOC content limits for major categories were implemented (without a viable averaging provision), acetone would serve as a replacement primarily for mineral spirits (paint thinner), not MEK, toluene, and

[10] *See* EPA, "Study of Volatile Organic Compound Emissions From Consumer and Commercial Products," Report to Congress, at 3-5 (March 1995).

xylenes.[11] This replacement of mineral spirits with acetone would be widespread,[12] and would result in considerably increased health and safety hazards.

CHAPTER V – PROJECT ALTERNATIVES

Alternatives Rejected as Infeasible

Performance-Based Standards

15-42 Industry has often suggested that mass-based VOC regulations are an extremely inefficient method for reducing VOC emissions, because reductions in VOC content of coatings may lead to increased paint use. For example, reducing the VOCs in a can of paint by 50% can be environmentally harmful if more than twice as much paint is necessary to complete a job. To properly evaluate the effectiveness of the SCM, therefore, the Draft EIR must determine not only the level of VOC emission reductions from a given volume of paint, but also changes in the amount of paint required to complete a given job, as affected by changes in product performance, including reduced coverage and the need for more coats, more thinning, more priming, more touch-ups, or more frequent recoating. Consistent with these considerations, the proper measure of emissions potential is emissions per area covered divided by service life.

The Draft EIR rejected a performance-based alternative "because no consensus could be reached" regarding measurement of performance standards. (EIR at V-139). This excuse disingenuously ducks the issue. As indicated by this comment letter, no "consensus" has been reached on many of the issues included in the SCM. Moreover, ARB staff never attempted to generate a consensus on this issue, instead they rejected this alternative out of hand. Without performance-based standards, however, the potential exists for the SCM to yield adverse environmental impacts due to increased paint usage. The Draft EIR's refusal to seriously consider a performance-based alternative is not consistent with the requirements of CEQA.

Seasonal Regulation

15-44 There is no disagreement that ozone is a problem during only a few (primarily summer) months of the year, when atmospheric and climatic conditions are conducive to ozone

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15-43 [11] Mineral spirits represent approximately 80 percent of the volume of solvents used in solventborne architectural coatings. In aggregate, MEK, toluene, and xylenes make up only five percent. Harley, et al. "Respeciation of Organic Gas Emissions and the Detection of Excess Unburned Gasoline in the Atmosphere," 25 Environ. Sci. Technol. 2395, 2398 (1992).

[12] For example: a typical solventborne Primer, Sealer & Undercoater formulated with mineral spirits to meet the current limit of 350 g/L could be reformulated to meet the proposed limit of 200 g/L by replacing half the mineral spirits with acetone. This would greatly increase the product's potential health and safety impacts.

formation. For this reason, industry has long suggested that regulators should adopt a seasonal approach to regulating architectural coatings.

The Draft EIR rejects this alternative for a number of reasons. First, the Draft EIR suggests that manufacturers may have difficulty managing their inventory to comply. (EIR at V-139). Of course, if this were a real issue, manufacturers could avoid the
15-44 problem by producing compliant coatings year-round. Second, the Draft EIR suggests that it is "not realistic" for individual painters to know when they may use a particular can of paint. The Draft EIR offers no explanation why labeling will not solve this problem -- in fact, the Draft EIR relies on the ability of paint users to follow instructions regarding thinning requirements to justify other aspects of the Draft EIR. (*Id.* IV-65 to IV-67). Finally, the Draft EIR suggests that enforcement would be difficult. (*Id.* at V-139). The Draft EIR does not discuss any possible enforcement mechanisms and does not estimate the cost or otherwise quantify the "difficulty" associated with a seasonal system. This is unfortunate given the potential cost savings of seasonal regulation.

Regional Regulation

Industry has suggested that the SCM should be tailored to optimally regulate (or not
15-45 regulate) VOCs according to the unique atmospheric conditions of each air district. The Draft EIR rejects this alternative because it would be difficult to enforce and because of the difficulty modeling the effects of the SCM in various regions.

The Draft EIR's analysis raises more questions than it answers. If it is too difficult for the Draft EIR to predict the effects of regulation in various regions of the State -- *how can it rationally project state-wide environmental impacts of the SCM?* This is an excellent example of the kind of information that the new air chamber at the University of California at Riverside will help generate. Dunn-Edwards suggests that CARB postpone issuing a state-wide SCM for architectural coatings until the necessary data gaps regarding regional effects are filled.

Exceedance Fees

The Draft EIR rejects as infeasible an exceedance fee approach whereby manufacturers could pay a given fee to enable them to produce coatings with VOC content higher than the limits specified in the SCM. The Draft EIR's rejection of this alternative as
15-46 "infeasible" is puzzling, given that an exceedance fee provision is included in EPA's national architectural coatings rule. (*Id.* at V-140). The Draft EIR states that the fee under the national rule is too low, but that alone is not sufficient basis for rejecting this alternative altogether. Instead, CARB could institute a higher fee. The SCM's failure to include an exceedance fee option potentially has adverse environmental consequences because it precludes manufacturers form producing high quality coatings that do not meet the SCM's technologically infeasible limits. The resulting use of less durable inferior coatings could lead to the use of more paint and higher VOC emissions.

The LVP-VOC Exemption

Both EPA and CARB currently include exemptions for low vapor pressure ("LVP") VOCs in their Consumer Products regulations. (EIR at V-142 to V-143). This sets the legal and technical precedent for the inclusion of an LVP exemption in other regulations, including the SCM. Therefore, it is unclear, technically, why this alternative is being discarded by the Draft EIR as "infeasible" as part of the SCM. (*Id.* at V-141).

The Draft EIR argues that "regulatory consistency" would not be achieved by including a LVP exemption in the SCM, "because other regulations relating to architectural coatings . . . do not have such an exemption" currently. (*Id.* at V-143). These arguments are unavailing for at least two reasons. First, one purpose of the SCM is to *bring* consistency to architectural coatings regulation in California, (*see, e.g. id.* at V-168); therefore, the absence of consistency among existing rules is hardly a reason not to consider the LVP-VOC exemption in the SCM. Second, this "bait-and-switch" tactic obscures the real
15-47 issue, which is not consistency but rather equity: equal treatment for all similarly situated parties. As the Draft EIR explains the rationale for the consumer products LVP-VOC exemption, ARB staff "wanted to streamline the regulatory development of the consumer products regulation, minimize the impacts on industry, and provide formulation flexibility to manufacturers. It was felt that all of these goals could be accomplished by including the LVP-VOC exemption in the consumer products regulation, and thereby concentrate the regulatory effort on the higher volatility VOCs that were of the most concern for air quality." (*Id.* at V-145).

All of this rationale applies equally well to architectural coatings. The Draft EIR attempts to distinguish consumer products from architectural coatings by arguing that consumer products are essentially different in form and use. Many consumer products, however, are inherently "coating-like" -- they are applied to a surface and harden or cure by drying after application. Such products include: floor polishes, sealers, and waxes; adhesives; sealants and caulking compounds; and fabric protectants. Like consumer products, architectural coatings also contain a range of low volatility to high volatility compounds, with low volatility compounds making up a relatively small fraction of total VOC contents. LVP-VOCs in architectural coatings are used primarily as cosolvents in waterborne coatings, which have long been favored by regulators for their lower average VOC content. Exemption of LVP-VOC would greatly enhance formulation flexibility for these products, and thereby minimize regulatory impacts on both industry and consumers.

The Draft EIR further argues that "U.S. EPA does not support an LVP-VOC exemption for architectural coatings" because EPA Test Method 24 "is available to measure the
15-48 VOC content of architectural coatings" and this method supposedly "accounts for the volatility of solvents. Solvents that do not volatilize under Method 24 are not measured as VOC." U.S. EPA also believes that a general exemption for low volatility compounds would be inappropriate because these "compounds, under certain processes, would volatilize and participate in photochemical reactions." The "certain processes" alluded to, however, involve high temperatures and hot gas emissions. Architectural coatings are not heated during or after application, but Method 24 specifies that the paint sample must be heated above the boiling point of water, to 110 degrees Centigrade (230 degrees

Fahrenheit) for one hour, thus driving off compounds that would not volatilize to the same extent, or at all, under normal application conditions.

This is confirmed in various indoor air quality studies, including ARB's commissioned study on "Common Indoor Sources of Volatile Organic Compounds: Emission Rates and Techniques for Reducing Consumer Exposures," (Lawrence Berkeley National Laboratory, January 1999). This study demonstrated that only approximately 10 to 30 percent of latex paint LVP-VOC cosolvents are emitted during a two-week period following application to interior drywall. The report also states: "At present, it is not known whether 100 percent of the [cosolvents] absorbed by gypsum board are re-emittable." Even if the cosolvents were later emitted at much lower rates over much longer periods, most of the emissions would be occurring at times when they have no potential to contribute to ozone formation, *i.e.* during non-ozone season.

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Ultimately, failure to grant an exemption for LVP-VOCs in architectural coatings is counterproductive to optimizing the performance of waterborne coatings, thus adding to total ecological burdens of paint production, distribution, and use. Consequent impacts would affect not only air quality, but also water quality, material and energy resource consumption, health and safety, and solid waste disposal.

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Reactivity-Based VOC Limits

Dunn-Edwards supports CARB's stated commitment to studying reactivity issues and pursuing the possibility of implementing a reactivity-based architectural coatings rule. However, Dunn-Edwards disagrees with the Draft EIR's conclusion that such a reactivity-based rule is not already feasible for architectural coatings. Five years ago, Ted Russell's article in *Science* magazine concluded that reactivity-based architectural coatings regulations were feasible *at that time*.[13] CARB's subsequent experience with reactivity-based regulations in other fields, (EIR at V-152), should only make it easier for CARB to institute a similar regulation for architectural coatings. The Draft EIR contends that information limitations of existing coatings' VOC inventories and reactivity data prevent CARB from instituting a reactivity-based regulation immediately. Dr. Russell's article concludes that sufficient information currently exists. Any data gaps can be temporarily filled using reasonable assumptions or can be efficiently and quickly generated.

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When CARB does institute a reactivity-based regulation, Dunn-Edwards urges CARB to reconsider its apparent decision to the use of the Maximum Incremental Reactivity ("MIR") scale for characterizing the reactivity of VOCs. The MIR scale is valid only for an extremely narrow range of environmental conditions, found most often in the laboratory but not in the real world (except perhaps on occasion in a few heavily polluted urban cores). Under the ambient conditions that predominate throughout California -- specifically, low NOx or high VOC/NOx ratio conditions -- use of the MIR scale misrepresents real-world conditions and, if incorporated into regulations, might be counterproductive. VOC reductions in areas characterized by such conditions can

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[13] A. Russell, et al., "Urban Ozone Control and Atmospheric Reactivity of Organic Gases", Science, July 28, 1995, at 491

promote rather inhibit ozone formation due to environmentally-dependent negative incremental reactivity of most VOC solvents, including mineral spirits.

Alternatives Considered Feasible

Alternative A – No Project Alternative

15-52 The analysis of impacts and air quality benefits associated with each alternative is technically inaccurate and misleading to decision makers. Table II-1 summarizes CARB survey data which indicates that emissions from architectural coatings have decreased 9 tons per day between 1990 – 1996 or 1.25 percent annually in the absence of regulation. Therefore, Table V-3 inaccurately characterizes the No Project Alternative as having no emission reduction potential. This is untrue both because market forces are reducing VOC content in coatings regardless of regulation, and because the national rule is effective in one-half of all California air districts. Allowing consumer demand for waterborne products to continue to drive the market could result in more emission reductions than those expected to be achieved through implementation of the SCM.

Alternative D – Product Line Averaging

15-53 The Draft EIR rejects product-line averaging as an alternative to the SCM at this time, despite recognizing that it is a feasible alternative which would "improve cost-effectiveness of the rule." (EIR at V-138 to V-139). Product line averaging is viable and necessary to achieve any emission reductions at all from this proposed rulemaking because, without product-line averaging, the proposed emission limits are technologically infeasible.

15-54 The Draft EIR declares that "the existence or absence of averaging does not affect either the ARB's analysis of the technical feasibility of VOC limits in the SCM, or the ARB's environmental analysis for the SCM." Dunn-Edwards strongly disagrees. The SCM's proposed VOC limits are based on the SCAQMD's May 1999 amendments to Rule 1113. Unlike the SCM, however, Rule 1113 includes an averaging provision which allows manufacturers meeting certain conditions to distribute coatings with VOC contents above the limits, so long as each manufacturer also distributes sufficient volumes of coatings below the limits to offset the higher VOC products, so that product lines comply with their limits on average. As explained at pages 6 to 8 above, many of the VOC content limits in the proposed SCM -- without a viable averaging provision like that contained in Rule 1113 -- are beyond the scope of technological and economic feasibility, and into the realm of environmental counterproductivity. For example: the limits would ban more than 50 percent of all currently available Flat Coatings; 65 percent of Quick-Dry Primers, Sealers & Undercoaters; 72 percent of Industrial Maintenance Coatings; 97 percent of high-gloss Nonflat Coatings; and 100 percent of Quick-Dry Enamels. These product bans could become effective in as little as two or three years after local districts in California adopt or amend their local rules in conformance with the SCM. This period would be much too short to formulate, field-test, and market new, adequately performing, compliant coatings -- even if such products were possible within the constraints of currently available coatings technology (which they are not), and available financial resources. Available studies do not support the assumption that the SCM's VOC limits

are achievable absent this averaging provision. As also discussed above, if the limits are not feasible, adverse environmental effects will result.

15-55 According to the Draft EIR, "ARB staff is not considering using the Rule 1113 averaging approach in the proposed SCM." Although no averaging provision is included in the SCM currently, ARB staff is apparently considering an alternative averaging program that, in our opinion, would be excessively complex, burdensome, inefficient, and inequitable. Absent the details of the averaging provision under consideration, Dunn-Edwards corporation is unable to provide further comment at this time.

Technology Assessments

15-56 Dunn-Edwards urges CARB staff to consider including a provision encouraging local districts to perform Technology Assessments to ensure that high quality, durable coatings are available in the future.

15-57 As demonstrated above, the Draft EIR is insufficient to inform the ARB and the public regarding the potential significant adverse environmental effects of the SCM. CARB should revise and re-submit for further public comment the Draft EIR before moving ahead to finalize the proposed SCM. The new Draft EIR should accurately describe the environmental effects of the SCM, including detailed discussions regarding the different effects of VOC reductions in different areas of California; the environmental effect of the SCM in light of varying NOx levels and NOx transport across California; and the possible effects on coating usage (and so VOC emissions) that could result from the enforcement of the technologically infeasible VOC content limits set by the SCM.

15-58 Dunn-Edwards appreciates CARB's efforts in examining innovative and meaningful approaches to dealing with ozone nonattainment. We look forward to working with you on this and other important issues. These issues are the keys to the viability of our industry and our mutual goal of clean air.

Sincerely yours,

Howard Berman
Senior Vice President and
Environmental Counsel

Systematic Evaluation
of the Hazard Potential of Solvents

By Nicholas Kob / R&D Chemist, DuPont Nylon Intermediates and
Gerald Altnau / Business & Marketing Manager DuPont Nylon Specialty Intermediates, Wilmington, DE

There is an increased awareness around environmental protection and worker safety,[1] which has led to increased debate about which solvents are appropriate and safe to use in a number of applications and situations.[2,3] The government has taken the lead regulating the use of several solvents, such as 1,1,1-trichloroethane, which, effective Dec. 31, 1995, was phased out under the Clean Air Act of 1990. Also, numerous solvents have been labeled as suspected carcinogens. To users it is clear what the hazards are for these chemicals, and that their use presents an unsafe working environment. However, a clear understanding of a solvent's safety or potential risk as described above is the exception rather than the rule. In most cases it is extremely difficult to accurately evaluate the safety in the workplace of using one solvent vs. another. Generic phrases such as low toxicity, high flash point and low VOCs are used by many solvent manufacturers to describe solvents, but in many cases it only adds to the user's confusion. These descriptions are relative and are not based on scientific definitions, leaving users confused about the actual health and safety effects.

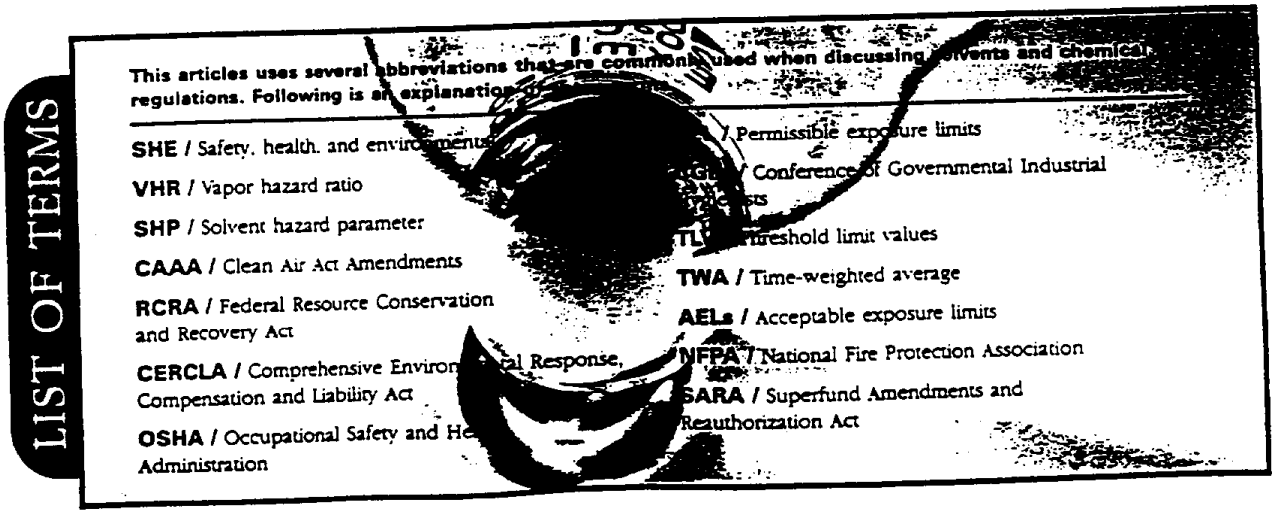
- Small- to medium-sized companies often can not afford, and/or find it is too time consuming to have a safety, health, and environmental (SHE) expert employed to guide solvent selection. External consultants are an option, but many times they are too costly for smaller companies. Given this situation, many stay with their existing solvent formulations as long as they remain legal, even if they present possible safety and/or health risks of which they are unaware.

This article describes a new tool that can easily and more accurately evaluate the risk potential of solvents and aid in the selection of safer replacement solvents. The parameters describe a vapor hazard ratio (VHR) and a solvent hazard parameter (SHP), which are based on existing guidelines to classify solvents according to their hazard potential.

Discussion

Numerous lists have been established that serve as guides for the selection of safe solvents.[4] These include VOCs; HAPs; Clean Air Act Amendments (CAAA) of 1990; the federal Resource Conservation and Recovery Act (RCRA); the federal Clean Water Act; and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). In addition to these lists, the Occupational Safety and Health Administration (OSHA) has set permissible exposure limits (PEL) on chemicals, and CGIH (Conference of Governmental Industrial Hygienists) has set chemical threshold limit values (TLV). It is easy to see how one can be overwhelmed when attempting to evaluate a solvent's hazard potential.

The TLV refers to airborne concentrations of substances and represents conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, without any adverse effects. Most TLVs are expressed as a time-weighted average (TWA) value, as this provides



the most practical way of monitoring the airborne reagent for compliance with the limits. The method most commonly used in the United States to evaluate a solvent's health hazard potential is by comparison of the chemical threshold limit values (TLV). Other countries establish their own exposure limits for chemicals, which are used similarly to the TLVs in the United States.

Many times a comparison of TLV alone can mislead people on the safety aspects of using one solvent vs. another. For example, if Chemical A has a TLV of 100 ppm and Chemical B has a TLV of 10 ppm, a conclusion could be drawn that chemical A is safer. However, this may or may not be correct since the TLV describes only the exposure limit and not how fast that limit is achieved. The vapor pressures of the solvents also need to be considered in order to describe accurately which solvent is safer. To further complicate the issue, no TLV values exist for many of the commonly used solvents.

DuPont internally evaluates the safety of chemicals for workers and the environment. Through its Haskell Laboratory, the company has for the last 20 years been studying the acute, subchronic, reproductive, mutagenic and other toxicological effects of chemicals. From these studies, the acceptable exposure limits (AELs) are determined for chemicals. These are DuPont's internal exposure limits. AELs are guidelines based on informed judgment, and are not fine limits between safe and dangerous concentrations. They are not for use as relative toxicity indexes, limits for continuous uninterrupted exposure, or proof or disproof of health effects. TLVs for many chemicals have not been established, and for those chemicals AEL values are used to guide worker safety in DuPont, and will be used in this article.

The boiling point of a solvent is often overlooked by many people who do not recognize that a high exposure limit may be reached quite quickly at ambient temperature and pressure conditions. People feel much more comfortable working with a chemical that has an exposure limit of 100 ppm than one that has an exposure limit of 5 ppm. It is counter-intuitive to most people that the solvent with the 5 ppm exposure limit may be safer to work with because its limit is reached more slowly. The problem is that no easy method exists to help users evaluate solvents that is based on the exposure limit, and the rate at which the limit can be achieved at a given set of conditions. In Germany a parameter referred to as the vapor hazard ratio (VHR) is used, which is the quotient of the saturation concentration and the exposure limit,[5] and addresses the previously described deficiency.

VHR = (saturation concentration, ppm) / (exposure limit, ppm)

The saturation concentration is the amount of chemical that is present at chosen conditions in a given volume of air, and is based on the vapor pressure of the solvent at the chosen conditions. It is easily calculated for any solvent using the following equation.

Saturation concentration, ppm = (vapor pressure, mmHg / 760)X10^6

The vapor hazard ratio reflects the risk potential of a solvent in terms of not only the exposure limit but also the rate at which that limit is achieved. Table 1 lists some of the more commonly used solvents and their associated VHR; solvents with lower VHR values have a lower potential health risk (are safer to use). For example, based solely on the exposure limit (TLV) one would consider acetone to have the lowest risk potential, but the VHR correctly shows that it has a much higher risk potential than a number of solvents. DuPont Dibasic Ester (DBE) solvent has a low exposure limit (as set by its AEL) but the VHR ratio correctly shows that it is one of the lowest potential health risk solvents.

Although the VHR correctly describes the risk potential based on exposure limits, it fails to describe other hazards that should be considered to ensure the safest workplace possible. A common concern when using solvents is the risk of fire. Every year numerous injuries occur as the result of a fire involving a solvent. We feel this is an additional parameter that an employer should consider to more accurately describe the risk potential of a solvent. The National Fire Protection Association (NFPA) has established a set of criteria for evaluating the fire hazards of solvents and other materials. It is based on the susceptibility of a material to burning. The following rating is based on the NFPA criteria, and ratings for any solvent/chemical can be found on the MSDS for that chemical.

0 — Materials that will not burn.

1 — Materials that must be preheated before ignition (flash pt. above 100°F).

2 — Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition (flash point between 73–100°F).

3 — Materials that can be ignited under almost all ambient temperature conditions (flash point below 73°F (22.8°C) and boiling point above 100°F).

4 — Materials that rapidly or completely vaporize at ambient conditions, and burn readily (flash point below 73°F (22.8°C) and boiling point below 100°F).

The solvent hazard parameter (SHP) is the VHR multiplied by the fire hazard rating, and is another method for assessing the risk potential of a solvent since it combines the health exposure and fire hazards. A listing of the SHP values for a number of the more common solvents is shown in Table 1, with the lowest SHP values corresponding to the lowest risk potential for a chemical (safest to use). The table is organized such that the lowest SHP solvent is at the top, and the highest SHP solvent is at the bottom.

It is important to state that the SHP values and VHR values do not completely describe all the hazards or parameters that an employer should consider. Other possible hazards/factors include chemical incompatibility, reaction with the process or other solvents, and the biodegradability of the solvent.

One must also consider that many chemicals have ceiling limits of exposure. The exposure limit also does not describe the health hazard effects to an individual if the exposure limit is exceeded. For example, one chemical's TLV could be set to protect workers from skin irritation while another could be set due to toxicity. Employers/workers, in addition to looking at the VHR and SHP (which are based on exposure limits) should consult the MSDS to determine the human health effects associated with exceeding the exposure limit. The Superfund Amendments and Reauthorization Act (SARA) requires that some chemicals be disclosed as toxic under SARA

Table 1 / Risk Potentials of Commonly Used Solvents

Solvent	*TLV/AEL (ppm)	Vapor Pressure (mmHg)	Saturation Conc. (ppm)	VHR	Flammability Rating	SHP	SARA 313 Listed
TPM	100	0.03	39	0.39	1	0.39	No
Propylene carbonate	20	0.02	26	1	1	1	No
*DB	5	0.02	26	5	2	10	Yes
DPM	100	0.6	723	7	2	14	No
DuPont DMPD	5	0.07	92	18	1	18	No
*NMP	25	0.3	394	16	2	32	Yes
*Solvesso 150	50	1	1,316	26	2	52	No#
*DMSO	10	0.6	789	79	1	79	No
Mineral spirits	100	3	3,947	39	2	78	No
*DuPont DBE	1.5	0.1	131	87	1	87	No
EB	20	0.6	789	39	2	78	Yes
*d-limonene	50	2	2,632	53	2	106	No
Isophorone	25	1	1,316	53	2	106	No
PM	100	11	14,473	144	3	432	No
DMAc	10	2	2,632	263	2	526	No
DMF	10	3	3,947	395	2	790	Yes
EEA	5	2	2,632	526	2	1,053	No
PMAc	10	4	5,263	526	2	1,053	No
MIBK	50	15	19,737	395	3	1,185	Yes
MEK	200	70	92,105	461	3	1,382	Yes
Acetone	500	248	326,316	653	3	1,959	No
EE	5	4	5,264	1,053	2	2,106	Yes
Toluene	50	28	36,842	737	3	2,211	Yes
Methanol	200	127	167,105	836	3	2,508	Yes
Methylene chloride	50	350	460,526	9,210	1	9,210	Yes
Benzene	1	95	125,000	125,000	3	375,000	Yes

Increasing Safety

* DuPont AEL exposure limits were used since no TLV values available.
# - Naphthlene contained in product is SARA 313 listed
TPM – tripropylene glycol methyl ether
DB – diethylene glycol butyl ether
DPM – dipropylene glycol methyl ether
DMPD – Dimethyl-2-Piperidone
NMP – N-Methyl-2-pyrrolidone
DMSO – Dimethyl Sulfoxide
DBE – DuPont's dibasic ester
EB – ethylene glycol butyl ether
PM – Prolylene glycol methyl ether
DMAc – N,N-Dimethyl acetamide
DMF – N,N-Dimethylformamide
EEA – ethylene glycol ethyl ether acetate
PMAc – propylene glycol methyl ether acetate
MIBK – methyl isobutyl ketone
MEK – methyl ethyl ketone
EE – ethylene glycol ethyl ether

Figure 1 / Hansen Solubility Parameter Map

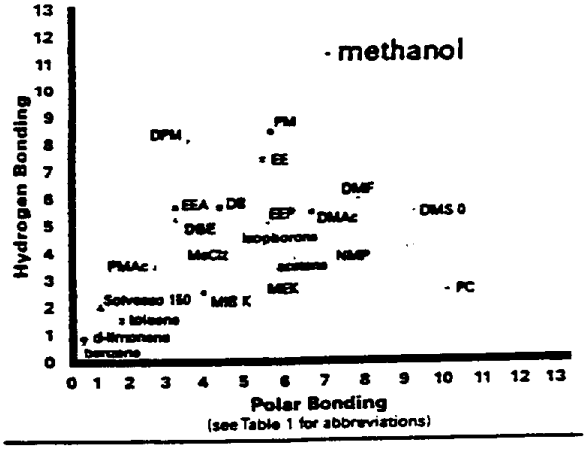
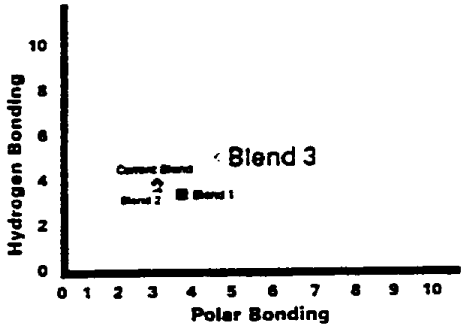


Figure 2 / Low Risk Solvent Blends for Paint Stripping



313. The chemicals that require disclosure under SARA 313 are indicated as such in Table 1. Solvents with a low VHR and SHP (safer solvents) are not listed on SARA 313 (with a few exceptions) consistent with the indication of a solvent's safety given by these metrics.

The following examples show how the VHR and SHP can be easily and proactively used to develop safer solvent formulations. Hansen solubility parameters are used to classify solvents in terms of their nonpolar, polar and hydrogen bonding characteristics.[6] They provide a systematic method that can be used to search for substitute solvents, or determine the solubility of a resin in a solvent or solvent blend. Figure 1 shows the location of a number of the commonly used solvents in terms of their Hansen polar and hydrogen bonding characteristics.

Replacement of a Solvent Blend in a Paint Stripping Application

A typical paint stripping blend (labeled current blend in Figure 2) is shown in Table 2.

An exposure limit (TLV or AEL) for a liquid mixture can be calculated on a time-weighted average exposure basis assuming the atmospheric concentration is similar to that of the original mixture (all the liquid mixture eventually evaporates). When the percent composition (by weight) is known the exposure limit of the mixture is determined by the following equation.

Exposure limit mixture = 1/[(fa/TLVa) + (fb/TLVb) + (fc/TLVc) +...(fn/TLVn)]

(where fn is the weight fraction of component n and TLVn is the exposure limit of component n.)

However using a TLV exposure limit for a liquid mixture presents the same limitations when trying to evaluate the potential health risk of the mixture as in the case of a pure chemical. Following is an alternative method using the VHR in place of the TLV to more accurately reflect the health risk a solvent mixture poses.

Using a solvent formulation program (DuPont as well as

Exposure limit mixture = 1/[(fa/VHRa) + (fb/VHRb) + (fc/VHRc) +...(fn/VHRn)]

many other companies offer such services to customers), the Hansen parameters for the above hypothetical solvent blend is found to be nonpolar 8.6, polar 2.3 and hydrogen bonding 3.2. Figure 2 shows the location of the blend on a solubility map. The Hansen parameters describe the solvency of the solvent blend and it is desired that a replacement solvent/blend have similar Hansen parameters to perform adequately. Table 1 reveals that although methylene chloride and toluene have TLV values that are mid-range compared to the other solvents, their VHR and SHP reveal these solvents to have a high potential health risk. Generally, the replacement solvent blend must have similar solvency (Hansen parameters) to perform adequately. As is almost always the case there is no single correct answer for a replacement solvent in a blend. A few possible answers are shown in Table 3.

Comparison of the VHR and SHP values shows the proposed formulations to be solvent blends of lower hazard potential than the current blend. Calculation of the exposure limits for the solvent blends confirms the conclusion shown in Table 4.

The Hansen parameters for the proposed solvent

Table 2 / Solvent VHRs and SHPs

Solvent	Solvent VHR	Solvent SHP
30% Methylene chloride	9,210	9,210
40% Toluene	737	2,211
30% MEK	461	1,382

blends 1-3 are shown in Figure 2.

A solvent blend SHP can be calculated by either measuring or calculating the flash point for the solvent blend and using the ratings previously described in this article to assign a fire flammability rating. Then multiply the flammability rating by the VHR for the blend.

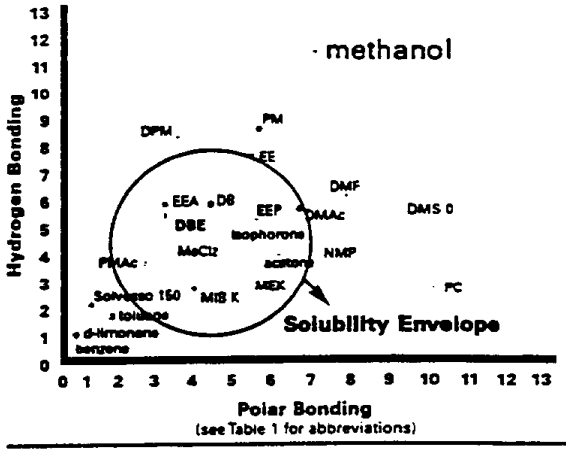
Replacement of Solvent Blend in a Coatings Application

Isophorone is a solvent that many coatings formulators have replaced or want to replace in their existing formulations. A replacement blend must meet criteria such as evaporation time and evaporation profile, and leave a defect-free coating. Replacing isophorone the highest boiling solvent or tails solvent in the blend with another good tails solvent is crucial to the replacement blends performance. Often isophorone can be replaced by DuPont DBE or another high boiling solvent of low health hazard potential.

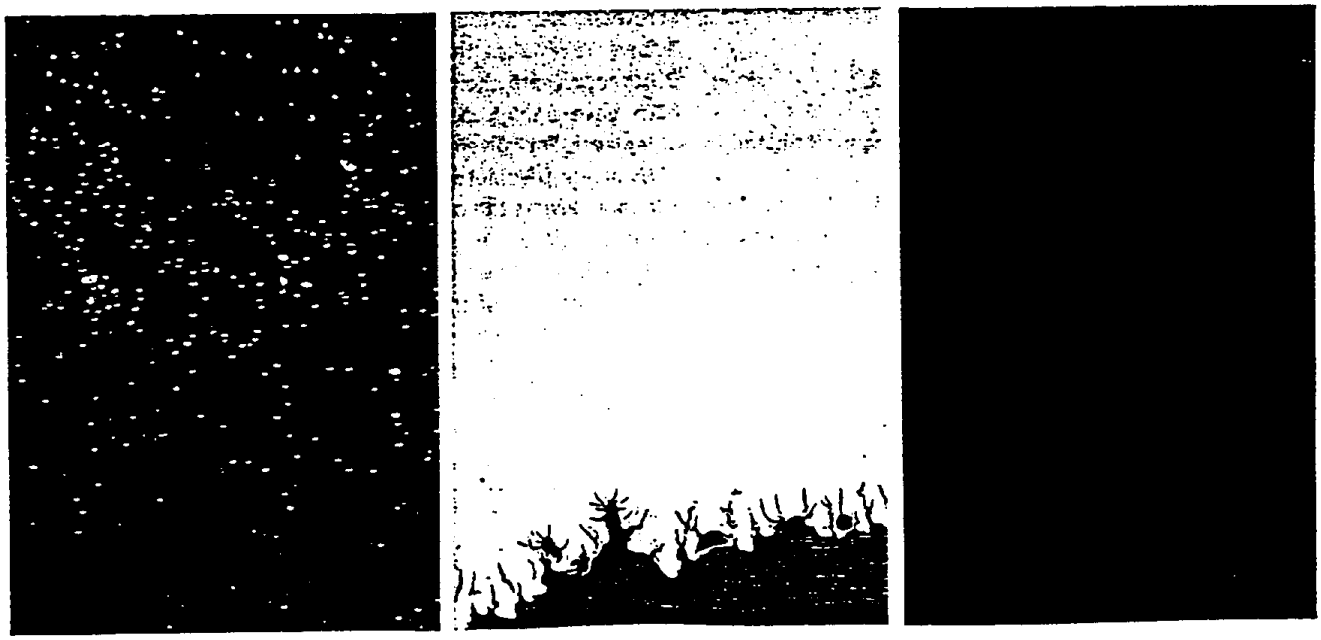
Cleaning of Equipment or Tools

Acetone is commonly used in the fiber-reinforced plastics industry as a cleanup solvent. However, inspection of Table 1 shows that acetone is high risk potential mainly due to its flammability and low flash point. Acetone has Hansen parameters of nonpolar 8.0, polar 5.2 and hydrogen bonding 3.5. The DuPont computer solvent formulation program is used to establish the solubility envelope

Figure 3 / Solubility Envelope for a Resin



Waterborne problems have you



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for a given resin by testing its solubility in a number of solvents of differing Hansen parameters. The solubility envelope encloses (in a circle) the solvents or blends that would dissolve the resin. As shown in Figure 3, DBE as well as other solvents could be good replacements in this particular example. Solvent blends can be effective even if one or more of the components of the blend are not in the resins solubility envelope. For example, in Figure 3, propylene carbonate is not in the solubility envelope, but a 60% DBE and 40% propylene carbonate blend has solubility parameters that fall in the envelope (calculated using the computer program). The DBE or DBE-propylene carbonate blend has a much lower health hazard potential than acetone, and in this case would be just as effective a cleanup solvent. As was the case for paint stripping, several possible blends or solvents could be used in this application.

Conclusion

Worker safety and environmental preservation are two of the most important parameters used in the selection of solvents for processes by employers. We propose the use of two easily calculated metrics VHR and SHP as tools for

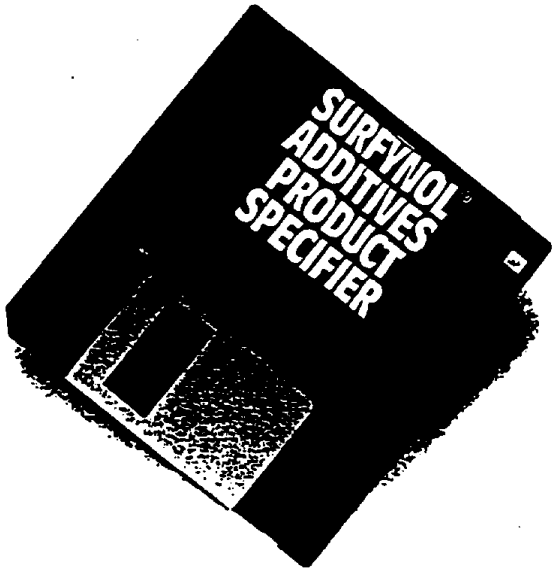
Table 3 / Solvent Blend VHRs and SHPs

Blend #	Solvents	Solvents VHR	Solvents SHP
Blend 1	35% d-limonene	53	106
	35% DuPont DBE	87	87
	10% Propylene carbonate	1	1
	20% NMP	16	32
Blend 2	40% DuPont DBE	87	87
	20% NMP	16	32
	40% Solvesso 150	26	52
Blend 3	35% DuPont DBE	87	87
	30% DMSO	79	79
	15% DPM	7	14
	20% Mineral spirits	39	78

Table 4 / Solvent Blend Exposure Limits

Solvent Blend	Blend exposure limit (using VHR)
Current Blend	816
Blend 1	8
Blend 2	29
Blend 3	15

up a creek? Here's your paddle.



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workers and employers because they show more clearly a solvent's potential health hazards to workers. The metrics are based on exposure limits and physical properties for a given chemical, and their use is not limited to solvents. Further, since many countries establish their own exposure limits this approach can be used globally (using local exposure limits) to evaluate and compare solvents. We also advise that in addition to VHR and SHP parameters, one should read the chemical's MSDS and consider other risk factors such as carcinogenity, biodegradability, and chemical reactivity. ≡

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For more information on solvents, contact DuPont, PO Box 1089, Orange, TX 77631; phone 800/231.0998; visit dupont.com/intermediates; or **Circle Number 92.**

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Common Indoor Sources of Volatile Organic Compounds: Emission Rates and Techniques for Reducing Consumer Exposures

Final Report

Contract Number 95-302

EXCERPT

Prepared for:

California Environmental Protection Agency
Air Resources Board
Research Division
2020 L Street, P.O. Box 2815
Sacramento, CA 95812

Prepared by:

Alfred T. Hodgson
Environmental Energy Technologies Division
E.O. Lawrence Berkeley National Laboratory
1 Cyclotron Road
Berkeley, CA 94720

January 1999

For more information about the ARB's Research Division, its research and activities, please visit our Web site:

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ABSTRACT

This investigation characterized the emissions of volatile organic compounds (VOCs) from interior latex paints and newly manufactured carpet and vinyl flooring materials that are representative of materials widely used in California. Specimens of three or more materials in each major source category were obtained and screened for their emissions of VOCs over 48 or 96 hours using small-scale chambers. Forty-five experiments were conducted with 24 primary materials. Seventeen of the VOCs measured have been identified as toxic air contaminants by the California Air Resourses Board. Based on small-chamber results, a paint combination, a carpet assembly, and a vinyl flooring assembly were selected for investigation in large-scale chamber experiments designed to simulate conditions in a small residential room environment. Thirteen large-scale experiments were conducted to provide real-world emissions data and evaluate the effectiveness of several techniques that consumers might use to reduce concentrations of VOCs and their cumulative exposures to these compounds. The exposure reduction techniques included additional ventilation for three days following installation (all source assemblies), additional air mixing (paint combination), airing out of materials prior to installation (carpet and vinyl flooring assemblies), and room heating at 33° C subsequent to installation (all sources present together). The assemblies were installed following typical construction industry practice and concentrations of selected VOCs in chamber air were measured over the following two weeks. For each assembly, one or two experiments were performed using a base-case low ventilation rate scenario and two experiments were performed to evaluate the treatments. Two of the 13 experiments employed a combination of all three assemblies. One of these was extended for a period of three months to obtain information on the longer-term emission characteristics of the sources.

There were clear differences in VOC emissions among materials in each class. Therefore, the results demonstrated that there are opportunities to reduce exposures by selecting materials that emit lower amounts of toxic or odorous VOCs. A short period of additional ventilation following material installation generally increased the mass emissions of the compounds and also reduced the cumulative exposures for many compounds during the period of additional ventilation. After the period of additional ventilation, room concentrations were similar to concentrations in experiments without additional ventilation. This suggests that additional ventilation is likely to be a more effective treatment if it can be maintained for longer periods. Airing out carpet material for several days prior to installation effectively reduced the emissions of VOCs. After installing materials, applying heat to the chamber, in conjunction with additional ventilation, increased the emissions of VOCs during the heating period, but was relatively ineffective for reducing the subsequent concentrations and exposures for most compounds.

EXECUTIVE SUMMARY

BACKGROUND

Paints and other materials used to finish the interiors of buildings can emit volatile organic compounds (VOCs), including some toxic pollutants, exposing building occupants to the resulting emissions. The Air Resources Board (ARB) is required to consider such indoor exposures in assessing the risks to public health posed by toxic air contaminants (TACs), as required by California Health and Safety Code, Section 39660.5. The ARB provides information and guidance to the public regarding exposures to TACs, including exposures that occur indoors. In order to perform these assessments, it is necessary to identify the potential sources for the compounds of interest and determine the emission characteristics of these sources. This study was designed to generate data that is needed by ARB to perform these functions.

EXPERIMENTAL METHODS

The three general categories of interior finish materials selected for this study were interior latex paints, carpet and associated materials, and vinyl floor installation materials. First, the brand names of materials in each category that are widely used by California consumers were identified. Then, newly manufactured specimens of three or more materials in each major category were obtained for testing. Forty-five screening measurements were conducted with specimens of 24 primary materials. These measurements were conducted over 48 or 96 hours at standardized conditions in small-scale environmental chambers. The VOCs emitted by the materials were identified and chamber concentrations and specific emission rates for selected individual compounds and total VOCs (TVOC) were determined. Formaldehyde and acetaldehyde were also quantified.

In the second phase of the study, 13 large-scale experiments were conducted to characterize the emissions from realistic assemblies of the sources and evaluate the effectiveness of treatments that consumers might employ in their residences to reduce their exposures to VOCs. These experiments were performed in a chamber facility designed and operated to simulate a residential room environment. The walls and ceiling of a chamber compartment were painted gypsum board, the floor was carpeted or covered with sheet vinyl, and typical furnishings were installed. These surfaces mimicked typical "sink" effects that may substantially alter the impacts of emissions from indoor sources. Consequently, the net results produced by these experiments should be more realistic than those obtained in an all stainless-steel chamber with an abnormally low sink effect.

For each large-scale experiment, air samples for the analysis of VOCs and aldehydes were collected from the chamber throughout the first day following installation of the materials, then daily over the next nine days, with final samples taken on day 14. One experiment with combined source assemblies (carpet and vinyl flooring assemblies and paint) was extended for a total period of 90 days, with samples collected weekly.

The exposure reduction techniques that were investigated included: additional ventilation for three days following installation (all source assemblies); additional air mixing (paint); airing out of materials prior to installation (carpet and vinyl flooring assemblies); and room heating to 33° C following installation (combined assemblies). The results of the exposure reduction experiments were compared with those from base-case experiments (experiments with no exposure reduction actions) to quantify the effects of the treatments. The parameters evaluated were VOC concentrations, total VOC mass emissions, and potential cumulative exposures for full-time occupants.

RESULTS OF SCREENING MEASUREMENTS

The screening measurements generated a large amount of quantitative data on the emissions of VOCs, including 17 identified TACs. This data can be used by ARB in exposure models to estimate indoor exposures.

Twelve target compounds, including five TACs, were quantified for latex paints. The predominant VOC emissions from the conventional latex paints were a solvent component (typically ethylene glycol and propylene glycol) and the Texanol® coalescing aid. The emissions from two new generation, "non-VOC" paints did not contain glycol ethers. These paints also had much lower emission rates of SigmaVOC (*i.e.*, the sum of the quantified components) than the conventional paints.

Forty-six target compounds, including 13 TACs, were quantified for the carpet materials. All of the carpets emitted 4-phenylcyclohexene (4-PCH), an unwanted byproduct in the production of styrene-butadiene rubber latex. Styrene was detected in the emissions from three carpets. The emission rates of styrene were near detection limits, demonstrating a significant reduction relative to previously reported results. The two intermediate-grade nylon pile carpets emitted fewer VOCs and had lower emission rates of individual VOC and TVOC than the olefin carpets. The nylon carpets met the emissions guidelines of the Carpet and Rug Institute's (CRI) Indoor Air Quality Testing Program. Olefin carpets did not meet the CRI guidelines; however, the testing conditions were altered somewhat from the CRI procedures. All of the bonded urethane carpet cushions emitted butylated hydroxytoluene (BHT). The TVOC emission rate for the synthetic fiber cushion was substantially lower than the TVOC emission rates for the bonded urethane cushions.

Forty target compounds, including ten TACs, were quantified for the vinyl flooring materials. All of the sheet vinyls were a source of phenol, an identified TAC. The residential sheet vinyls with a clear "no-wax" top coat emitted more compounds and had higher emission rates of individual VOCs and TVOC than the single commercial sheet vinyl. The new-generation "solvent free" or "low VOC content" adhesive products were the source of a number of VOCs. No experiments were conducted with conventional adhesives.

RESULTS OF EXPOSURE REDUCTION EXPERIMENTS

In general, the use of additional ventilation at two air changes per hour for the first three days of an experiment decreased the chamber concentrations of many target VOCs during the treatment period, relative to the base-case experiments. Consequently, this treatment often produced beneficial effects with respect to cumulative exposures calculated for the first 48 hours after material installation. However, upon termination of additional ventilation, the chamber concentrations frequently returned to values similar to those measured in the base-case experiments. Thus, the beneficial effects of the treatment, with respect to potential exposures calculated for the remainder of the experimental period beginning 48 hours after material installation, were limited to specific compounds and were often relatively minor.

The large-scale experiments with paint produced the highest VOC concentrations. The dominant compounds were ethylene glycol and Texanol®. The initial concentrations of these compounds frequently ranged up to several tens of milligrams per cubic meter. The concentrations of the dominant VOCs were somewhat lower during the initial three-day period of additional ventilation, compared to the base-case experiments. Following the termination of additional ventilation, the concentrations in the treatment and base-case experiments were similar. The use of fans to increase air velocities at the painted surfaces, in combination with additional ventilation, did not result in large-magnitude reductions in air concentrations of the target VOCs, relative to the experiment with only additional ventilation.

The room concentrations of the target VOCs emitted by the carpet assembly were generally low when compared to the concentrations of VOCs emitted by the other source assemblies. The use of additional ventilation temporarily reduced the concentrations of many of the target VOCs emitted from the carpet. However, after the ventilation rate was reduced, the concentrations typically increased to values similar to those measured in the base-case experiment. One exception was the BHT emitted by the carpet cushion that reached slightly higher values in the treatment experiment with additional ventilation.

The vinyl flooring assembly emitted a large number of compounds. The compounds with the highest concentrations were tetrahydrofuran and cyclohexanone emitted by the seam sealer, toluene emitted by the sheet flooring adhesive, and n-tridecane and phenol emitted by the sheet vinyl flooring. The concentrations of tetrahydrofuran, cyclohexanone, and toluene, all volatile compounds, decreased rapidly over the first 24-48 hours of the experiments. Additional ventilation substantially decreased the concentrations of these compounds compared to the base-case experiment. Additional ventilation, however, had relatively small effects on the concentrations of the less volatile VOCs emitted by the assembly, such as phenol, TXIB® (a vinyl plasticizer), and benzothiazole.

Airing out materials for two days prior to their installation was effective for reducing the concentrations of VOCs emitted by the carpet assembly materials relative to the base-case experiment. This translated into reduced exposures for these constituents. However, the fractional reductions in exposures for two of the dominant compounds, 4-PCH from the carpet and BHT from the carpet cushion, beginning 48 hours after installation of the carpet, were relatively small. Airing out the sheet vinyl and the cove base had only a short-lived effect on the concentrations of the target VOCs or none at all.

Moderate in-situ heating, in combination with additional ventilation, increased the concentrations of many of the individual VOCs and TVOC emitted by the three combined source assemblies (carpet and vinyl flooring assemblies and paint). The effects were generally highest at the onset of heating and diminished with time over the 72-hour (72-h) heating period. However, the effects were largely limited to the actual heating period. Once heating was discontinued, the concentrations of many of the compounds quickly returned to values that were similar to those measured in the experiment with additional ventilation but no heating. Texanol®, one of the dominant compounds emitted by the latex paints, was an exception. Its longer-term concentrations decreased as a result of heating.

The long-term experiment was conducted at the base-case ventilation rate of 0.5 air changes per hour following a 72-h period of additional ventilation. The concentrations of a number of the dominant target VOCs and TVOC emitted by the three combined source assemblies remained relatively constant or decreased by less than a factor of three over the period of two to 12 weeks.

CONCLUSIONS

This is the first study to characterize VOC emissions from vinyl flooring assemblies and to obtain long-term measurements from the combined sources. This study generated a large amount of quantitative data on the emissions of VOCs, including TACs, from indoor sources commonly used by California consumers. Additionally, the study quantified the effects of several exposure reduction techniques that homeowners or building managers might use to reduce the concentrations of VOCs and occupant exposures to VOCs following construction and/or remodeling of their homes or businesses.

The exposure reduction experiments demonstrated that there are some general practices homeowners or building managers can follow that may reduce VOC concentrations and decrease cumulative exposures to VOC emissions in their environments.

1) Materials that emit lower amounts of toxic or odorous VOCs should be selected whenever possible. This should lower occupant exposures and decrease the need for subsequent control strategies.

2) If possible, carpets and carpet cushions should be aired out in a well-ventilated, clean, dry environment for several days prior to their installation.

3) Very high, mechanically induced ventilation rates should be used during the application or installation of materials to protect the installers and any occupants that are present. This technique may also reduce subsequent occupant exposures.

4) Additional ventilation should be maintained for periods longer than three days to more effectively lower occupant exposures.

5) The amount of additional ventilation should be maximized. In many cases, the beneficial effects of ventilation, with respect to concentrations and exposures, are not in direct proportion to the increase in the ventilation rate.

6) The most effective way to reduce occupant exposures to the dominant VOCs emitted by latex paints is to delay occupancy for several days following painting.

7.0 EXPOSURE REDUCTION EXPERIMENTS WITH THE LATEX PAINT COMBINATION

7.1 EXPERIMENTAL TREATMENTS

Four large-scale experiments were conducted with the combination of latex paints consisting of materials LPS2, FLP3 and SGLP3. Two of these experiments, P-1 and P-2, were conducted at the base-case ventilation rate of 0.5 h^{-1} over 2 - 336 h. The results from these experiments were used to assess overall reproducibility of the methods and served as the basis for evaluating the efficacy of the two treatments. One of the treatment experiments, P-3, was conducted using additional ventilation for the first 72 h. The ventilation rate during painting and for the following two hours was 5 h^{-1}. From 2 - 72 h, the ventilation rate was 2 h^{-1}. The other treatment experiment, P-4, was conducted using the same ventilation conditions as Experiment P-3. In addition, air mixing at the surfaces of the painted gypsum panels was increased by the use of two oscillating room fans operated on their highest speed setting. Increased air velocities should have the effect of decreasing the effective thickness of the air boundary layer at the surface of the paint film that could accelerate the evaporation of the VOCs. This treatment was predicted to be most effective in combination with increased ventilation. The ventilation rate data and the compartment temperatures and relative humidities for the experiments are summarized in Appendix H, Table H-01. The ventilation rates and compartment temperatures were maintained within the established range limits. The relative humidity fell below the lower limit of 30 percent during portions of Experiments P-1 and P-2 (discussed below).

The paint application data for Experiments P-1 - P-4 is presented in Appendix H, Table H-02. Generally good uniformity in paint application was achieved as shown by the coverages in grams of wet paint applied per square meter of substrate surface area. The coverages for LPS2 ranged from 101 - 127 g m^{-2} with the lowest coverage for Experiment P-1. The coverages for the other three experiments were in a range of 118 - 127 g m^{-2}. The coverages for FLP3 in all four experiments were in a narrow range of 105 - 108 g m^{-2}. The coverages for SGLP3 in all four experiments were also in a narrow range of 100 - 105 g m^{-2}.

7.2 SELECTION OF THE TARGET COMPOUNDS

A qualitative analysis of the VOCs emitted by the paint combination in base-case Experiment P-2 identified ethylene glycol, propylene glycol and the two isomers of 2,2,4-trimethyl-1,3-pentanediol monoisobutyrate (Texanol®) as the most abundant compounds (Appendix H, Table H-03). There were several other oxidized compounds emitted at lower abundance. The six target VOCs selected for quantitative analysis in these experiments were: ethylene glycol; propylene glycol; n-buty ether; 2-ethyl-1-hexanol; 2-(2-butoxyethoxy)ethanol (di(ethylene glycol) butyl ether or DEGBE); and the combined Texanol® isomers (Appendix H, Table H-04). Hexylene glycol was not included as a target analyte because the calibration for this compound was unreliable. In addition, the aldehydes, formaldehyde and acetaldehyde, were sampled and analyzed in all four experiments. Formaldehyde, acetaldehyde, ethylene glycol and DEGBE are identified by the ARB as TACs.

7.3 CONCENTRATIONS OF THE TARGET COMPOUNDS

The concentrations of the six target VOCs in chamber compartment air and supply air during the four experiments with latex paints are presented in Appendix H, Tables H-05 - H-08. The concentrations for the duplicate VOC samples that were collected at several time points are given in these tables. It is noted that Experiment P-4 was terminated early at 240-h elapsed time because there was a two-day power outage following this sampling period in which the ventilation and data systems were off. The average concentrations of the six target VOCs in the supply air in all four experiments were below their lower limits of quantitation. The concentrations of these compounds in the background measurement periods were also at or below their lower limits of quantitation with the exception of Texanol® in Experiments P-3 and P-4. These were the second experiments to be conducted with paints in the compartments, and high ventilation rate flushing was incapable of reducing the background level of Texanol® to below its lower limit of quantitation.

The compartment concentrations of the dominant VOCs emitted in Experiments P-1 and P-2 were compared in order to assess the reproducibility of the methods. The concentrations of ethylene glycol in the four experiments are plotted in Figures 20a and 20b, and the concentrations of Texanol® are plotted in Figure 21. In these and the subsequent temporal plots, the data points are connected with dashed lines for the sole purpose of improving the readability of the plots. There were concentration differences at the beginning of Experiments P-1 and P-2 that were most notable for ethylene glycol. The cause, which is uncertain, may be related to the exact timing of sample collection with respect to the rapid temporal changes in concentrations immediately following painting. There were also relatively large temporal fluctuations in the concentrations of ethylene glycol in Experiment P-2 from approximately 120 h through the end of the experiment. Other than these obvious differences, there was generally good agreement between the two base-case experiments.

The environmental data for the experiments, summarized in Table H-01 shows that the relative humidity in Experiments P-1 and P-2 fluctuated over a relatively large range and fell below the lower target limit of 30 percent for some portion of the experiments. The compartment air relative humidity in Experiment P-2 is plotted in Figure 22. Figure 20b shows that there was a decrease in the ethylene glycol concentration at the 144- and 168-h sampling periods that corresponded with the period of the lowest relative humidity. This correspondence suggests that the water vapor concentration in air was either affecting the primary emission rate of ethylene glycol from the paints or may have had a secondary effect on the sorption and release of ethylene glycol by surfaces in the compartment. The concentration of propylene glycol may have been similarly affected. In Experiment P-1, the period of lowest relative humidity occurred between 240- and 336-h elapsed time when no air samples were taken. The screening measurements with the combination of paints LPS2 and FLP3 that were conducted at 30, 50 and 70 percent relative humidity demonstrated that the effect of water vapor concentration on the primary emission rates of VOCs, including ethylene glycol, from these paints was negligible or relatively minor (Appendix C, Tables C-51 - C-53). Therefore, it is possible that the effect of water vapor on the concentration of ethylene glycol in the large-scale experiments was primarily secondary and related to sorption/desorption phenomena.

The compartment relative humidity was within the target range and generally more stable during Experiment P-3. The supply air humidification system was added prior to initiating Experiment P-4. This system introduced water vapor into the supply air when the relative humidity of the supply air dropped below about 40 percent at room temperature. Thus, it was possible to maintain compartment relative humidity within the target range during the remainder of the experiments.

The compartment concentrations of the dominant VOCs in Experiment P-3 were compared to the corresponding concentrations in base-case Experiments P-1 and P-2 in order to assess whether there were any large-magnitude effects due to additional ventilation. Generally, the concentrations were lower in Experiment P-3 during the period of additional ventilation. However, the concentration differences were less than the four-fold difference in ventilation rate for this period. This suggests that the emission rates of these compounds increased at the higher ventilation rate perhaps due to mass transfer effects at the painted surfaces. Subsequent to 72-h elapsed time, the concentrations of both ethylene glycol and Texanol® were similar in all three experiments.

Prior to conducting Experiment P-4, air velocities were measured 5-cm above the surface at three locations (center of top half, approximate middle, and center of bottom half) for each of the five gypsum board panels with the two oscillating fans operating at their highest speed setting. The average air velocity was 54 ± 9 cm sec^{-1}. Velocities previously recorded 5-cm above the wall surfaces without the oscillating fans in the compartment were 20 ± 4 cm sec^{-1}. Thus, the added air mixing in Experiment P-4 resulted in about a factor of 2.5 increase in the air velocities near the painted surfaces. The added air mixing, however, did not result in any large-magnitude effect on the compartment air concentrations of the target VOCs as can be seen by comparing the concentrations of ethylene glycol and Texanol® for Experiments P-3 and P-4.

Since the samples were almost entirely dominated by a few compounds that were individually quantified, the concentrations for the total emissions of VOCs were quantified as SigmaVOC (Appendix H, Table H-09).

The concentrations of formaldehyde and acetaldehyde in compartment and supply air for Experiments P-1 - P-4 are presented in Appendix H, Tables H-10 and H-11, respectively. The background concentrations of these compounds were generally elevated over the supply air concentrations. This was presumably due to emissions from the wood frame and the plywood flooring of the chamber compartments. The chamber concentrations of formaldehyde during the experiments were only clearly elevated over background concentrations during the first day of sampling. The highest concentrations occurred during the first few hours of Experiments P-1 and P-2. The acetaldehyde concentrations substantially exceeded the formaldehyde concentrations. Clearly elevated concentrations of acetaldehyde occurred during the first six hours of sampling, with the highest concentrations occurring for base-case Experiments P-1 and P-2 (Figure 23). This difference may have been affected, in part, by the timing of the sample collection with respect to the occurrence of the peak compartment concentration of acetaldehyde. Nevertheless, the additional ventilation in Experiments P-3 and P-4 was apparently effective at removing the formaldehyde and acetaldehyde released during the painting procedure.

7.4 EMISSION RATES OF THE TARGET COMPOUNDS

Quasi steady-state emission rates of the target compounds in the four experiments were calculated with the mass-balance equation (Equation 1). Since the model assumes steady-state conditions and the compound concentrations, in many cases, were changing relatively rapidly during the first hours of the experiments, substantial uncertainty may have been introduced into the estimated emission rates for these beginning periods. The combined painted surface area of 16 m^2 was used in the calculations as there was no clear delineation of the sources of the dominant target compounds among the three paints.

The area-specific emission rates in milligrams of compound emitted per square meter of surface per hour (mg m^{-2} h^{-1}) are presented Appendix H, Tables H-12 - H-15 for Experiments P-1 - P-4, respectively. The area-specific emission rates of SigmaVOC are presented in Appendix H, Table H-16. An obvious difference among the experiments is that the emission rates of the dominant compounds were generally higher during the period of additional ventilation in Experiments P-3 and P-4 than during the same period of Experiments P-1 and P-2 (Figures 24a, 24b and 25). As discussed above, this was probably due to mass transfer effects at the painted surfaces. The estimated emission rates of ethylene glycol and Texanol® in the first hours following painting were clearly elevated in Experiments P-3 and P-4. However, as previously noted, there is substantial uncertainty in these estimates. A comparison of the emission rate results for Experiments P-3 and P-4 shows that there were no large magnitude effects due to increased air velocities at the painted surfaces.

The initial formaldehyde emission rates in Experiments P-1, P-3, and P-4 were similar, while the initial formaldehyde emission rate in Experiment P-2 was higher (Appendix H, Table H-17). The initial acetaldehyde emission rates were highest in base-case Experiments P-1 and P-2 (Appendix H, Table H-18).

7.5 CUMULATIVE MASSES AND EXPOSURES FOR THE TARGET COMPOUNDS

The results were first summarized by calculating the cumulative masses of the target compounds and SigmaVOC that were emitted over the experimental period (Appendix H, Table H-19). Since Experiment P-4 was terminated early at 240-h elapsed time, cumulative masses were determined for the 0- to 240-h period for all four experiments and for the 0- to 336-h period for Experiments P-1, P-2, and P-3. Deletion of the final four-day period did not have any effect on the relative differences among Experiments P-1, P-2, and P-3 for any of the target compounds.

The compounds with the distinctly highest cumulative mass emissions were ethylene glycol, propylene glycol and Texanol®. Additional ventilation and additional ventilation with air mixing in Experiments P-3 and P-4 resulted in higher mass emissions of these dominant

compounds. The data indicates that the mass emissions of acetaldehyde decreased with the two treatments. As previously discussed, this was probably an artifact caused by the timing of sample collection with respect to the rapid removal of acetaldehyde from the compartment. The relative magnitudes of the effects of the treatments on the cumulative mass emissions of the target compounds and SigmaVOC over - 240 h are illustrated in Figure 26. For this figure, the results for base-case Experiments P-1 and P-2 were averaged and then used to calculate the ratios for the two treatment experiments. For SigmaVOC and all of the compounds, except acetaldehyde, n-butyl ether and 2-ethyl-1-hexanol, the cumulative mass emissions were distinctly higher in the two treatment Experiments P-3 and P-4 than in the base-case experiments. The effects on cumulative mass emissions due to the added air mixing in Experiment P-4 relative to Experiment P-3 were most apparent for ethylene glycol and propylene glycol. The differences between these two experiments for the other compounds were minor.

The fractional compositions of ethylene glycol and Texanol® in paints LPS2, FLP3 and SGLP3 were determined by analysis of the bulk paints (Appendix C, Table C-58). The masses of ethylene glycol and Texanol® that were used in Experiments P-1 - P-4 were calculated from the paint application data and the paint compositions. These values are presented in Table 10 where they are compared to the cumulative masses of ethylene glycol and Texanol® emitted during the experiments. The average mass of ethylene glycol used in the four experiments was approximately 100 g, and the average mass of Texanol® was approximately 43 g. The cumulative mass emissions of ethylene glycol were 3.7 - 13.9 g over 0 - 240 h and 4.1 - 14.2 g over 0 - 336 h. Thus, only approximately 4 - 14 percent of the ethylene glycol that was applied with the paints was emitted over the 336-h period. The cumulative mass emissions of Texanol® were 6.9 - 13.2 g over 0 - 240 h and 8.6 - 15.0 g over 0 - 336 h. Only 19 - 35 percent of the applied Texanol® was emitted over the 336-h period. The results demonstrate the very large sorption losses and the slow re-emission of the major volatile organic constituents of latex paints applied to gypsum board. These results are excellent agreement with the results obtained in a small-scale chamber with another flat latex paint (Chang *et al.*, 1997). In that study, nine percent of the ethylene glycol and 29 percent of the Texanol® in the paint applied to gypsum board were emitted over the same 336-h time period. This similarity, despite the differences in the paint and the experimental apparatus and conditions, demonstrates that the gypsum board substrate plays a significant role in determining the emissions of VOCs from latex paint. At present, it is not known whether 100 percent of the ethylene glycol and Texanol® absorbed by gypsum board are re-emittable (Chang *et al.*, 1998).

The experiments and the treatment effects were next compared by examining the peak exposures to the target compounds that a residential occupant might receive at these conditions. The highest exposure concentrations (ppb) of the target compounds were measured shortly after paint application (Appendix H, Table H-20). The maximum concentrations of formaldehyde, acetaldehyde, n-butyl ether and 2-ethyl-1-hexanol were substantially lower in Experiments P-3 and P-4 with additional ventilation relative to base-case Experiments P-1 and P-2. For Acetaldehyde, there was an approximate ten-fold difference in maximum concentration. The maximum concentrations of ethylene glycol and propylene glycol in Experiment P-4 with additional ventilation combined with air mixing were about 60 percent of the respective maximum concentrations of these compounds in Experiment P-3 with additional ventilation only.

Finally, the experiments and the treatments were compared based on theoretical cumulative exposures in ppm-h for a residential occupant that were calculated for two different exposure periods.

The estimated cumulative exposures to the target compounds for the first 48 hours of the experiments are presented in Appendix H, Table H-21. For this calculation, occupancy began at time zero, the conclusion of paint application, and the occupancy factor was assumed to be 0.83 (*i.e.*, an occupancy of 20 hours per day averaged throughout the day). The cumulative exposures to formaldehyde, acetaldehyde, n-butyl ether and 2-ethyl-1-hexanol for this period were clearly lower in Experiments P-3 and P-4 with additional ventilation relative to the base-case experiments. The differences between the cumulative exposures for the two treatment Experiments P-3 and P-4 were all less than 25 percent. The relative magnitudes of the effects of the treatments on the

cumulative exposures to the target compounds over 0 - 48 h are illustrated in Figure 27. The results for base-case Experiments P-1 and P-2 were averaged and used to calculate the ratios for the two treatment experiments. This figure shows that the treatments did not result in large fractional reductions in the exposures to the dominant compounds, ethylene glycol, propylene glycol and Texanol®, for this initial two-day period.

Table 10. Applied masses (g) of ethylene glycol and Texanol® compared to the masses of these compounds emitted over 0 -336 h in Experiments P-1 - P-4. The applied masses were calculated from the paint application data (Appendix H, Table H-02) and the paint compositions (Appendix C, Table C-58).

Compound / Parameter	Exp P-1	Exp P-2	Exp P-3	Exp P-4
Ethylene glycol				
Applied mass (g)	90	103	100	104
Emitted mass (g)	4.08	6.8	14.2	10.0*
Fraction emitted (%)	4.5	6.6	14	9.6
Texanol®				
Applied mass (g)	39	45	43	45
Emitted mass (g)	8.6	8.6	15.0	11.8*
Fraction emitted (%)	22	19	35	26

*Masses were emitted over 0 - 240 h in Experiment P-4.

The estimated cumulative exposures to the target compounds for the remainders of the experiments are presented in Appendix H, Table H-22. For this calculation, occupancy began exactly 48 h after painting, thus avoiding the initial period of highest concentration. It was assumed that the daily duration of occupancy was 20 h. The compounds with the distinctly highest cumulative exposures in all of the experiments were ethylene glycol, propylene glycol and Texanol®. The treatment effects were most pronounced for the minor paint constituents. The most obvious difference was the reduction in the exposures to acetaldehyde in the two treatment experiments. Additional ventilation and air mixing decreased the cumulative exposure to n-butyl ether, and both additional ventilation and additional ventilation with air mixing decreased the exposure to 2-ethyl-1-hexanol.

The relative magnitudes of the effects of the treatments on the cumulative exposures to the target VOCs over 48 - 240 h are illustrated in Figure 28. The results for base-case Experiments P-1 and P-2 were averaged and used to calculate the ratios for the two treatment experiments. The figure shows that additional ventilation by itself did not result in reduced exposures to the dominant VOCs for this period. There were, however, approximate 25 percent reductions in the exposures to ethylene glycol and Texanol® in Experiment P-4 with additional ventilation combined with air mixing relative to the base-case experiments.

Figure 29 compares the magnitudes of the cumulative exposures estimated for the 0- to 48-h periods to the total cumulative exposures over 0 - 240 h that were calculated as the sums of the exposures for the two periods. For all compounds except Texanol®, the cumulative exposures estimated for the 0- 48-h periods of the experiments accounted for about one-half or more of the total cumulative exposures. The exposures to Texanol®, the least volatile compound, during the 0- 48-h periods were about 30 percent of the total exposures.

7.6 COMPARISON WITH THE SCREENING MEASUREMENT RESULTS

Latex Primer Sealer LPS2 and Flat Latex Paint FLP3 accounted for approximately 97 percent of the wet mass of paint applied in each of the four large-scale experiments. The average combined coverage of these two paints was 224 g m^{-2}. Three screening measurements were conducted with a combination of the LPS2 and FLP3 paints over a range of 30 - 70 percent relative humidity. The average combined coverage of the two paints in these experiments was 169 g m^{-2} or about 75 percent of the combined coverage of the two paints in the large-scale experiments. Emission rates of the target compounds and SigmaVOC in the small chambers were calculated for elapsed times of 48 and 96 h (Appendix C, Tables C-51 - C-53).

The 96-h emission rates (mg m^{-2} h^{-1}) of ethylene glycol, propylene glycol, DEGBE, Texanol®, and SigmaVOC in the three screening measurements and in the four large-scale experiments are compared in Table 11. Generally, the results agreed within about a factor of two. The emission rates of ethylene glycol were roughly comparable while the Texanol® emission rates were about a factor of two higher in the screening measurements. These discrepancies are relatively small considering that there were large differences between these experiments with respect to chamber ventilation rates, chamber surface-to-volume ratios, and the types and amounts of surface materials.

Table 11. Area-specific emission rates (mg m^{-2} h^{-1}) of ethylene glycol, propylene glycol, DEGBE, Texanol® and SigmaVOC at 96-h elapsed time in the three screening measurements with the LPS2 and FLP3 paint combination and in large-scale Experiments P-1 - P-4.

	Specific Emission Rate, mg m^{-2} h^{-1}			
	Screening Measurements Combined LPS2 & FLP3		Large-Scale Expts. P-1 - P-4	
Component	Avg.	Range	Avg.	Range
Ethylene glycol	0.36	0.20 - 0.57	0.54	0.46 - 0.59
Propylene glycol	<0.06	—	0.09	0.07 - 0.13
DEGBE	<0.03	—	0.01	---
Texanol®	3.24	2.68 - 3.83	1.60	1.12 - 1.92
SigmaVOC	3.65	3.02 - 4.09	2.23	1.67 - 2.57

Novel approach to formulation modelling

Long Lin
James T. Guthrie
Weidong D. He

Formulation optimisation is one of the more important steps in the development of surface coating systems. Several commercially available computer software packages that can be used to assist the formulation optimisation have been developed, provided that sufficient data are available. For systems having complex behaviour, more flexible techniques are needed. The approach that forms the basis of this paper is based on spline interpolations. Thus, the more complex behaviour of coating systems can be simulated and interpreted. The efficiency and the reliability of the models that have been developed have been evaluated using data that are relevant to anticorrosion coating systems.

When developing commercially viable surface coating formulations, it is often necessary to take several properties of the coating formulations into consideration. For instance, when developing an anticorrosion coating, the barrier properties and the flexibility of the coating systems and the adhesion of the coating to the substrate, usually need to be optimised. There are several computer-aided software packages now commercially available to facilitate such optimisation [1–2]. Most of these software packages employ existing statistical, analytical methods and/or neuronetwork principles. As such, most of these software packages perform well when used to optimise the compositions of coating systems having relatively simple property-of-interest/composition relationship. However, often there are coating systems that have a relatively complicated property-of-interest/composition relationship. In such cases, more effective approaches to modelling are required. *Guthrie and Lin* [3] developed a novel approach to experimental design and to formulation modelling that was based on the spline interpolation technique. Such an approach has proven to be particularly effective when modelling complex mixture systems [4–7]. In this paper is reported the application of such mathematical modelling approach to the development of anticorrosive coating systems. The basis to this modelling approach is given below. This is then followed by application of the approach to the development of effective anticorrosion formulations.

Modelling based on spline-interpolation

Establishment of mathematical models that reliably represent the relationship, between the properties/performance and the composition of the coating systems, is essential to the optimisation of surface coating formulations. A general form of such mathematical model is given as *Equation 1* below.

$$Y_i = f_i(X_1, X_2, ..., X_n) \qquad \textit{Equation 1}$$

Here, Y_i $(i = 1, 2, ..., m)$ denotes the properties of the coating system, m being the total number of property-of-interest. As indicated by *Equation 1*, such properties are dependent only on the composition (in terms of percentage or fraction) of the coating system, i.e. X_j $(j = 1, 2, ..., n)$, n being the total number of the components in the coating system. Clearly, the sum of the X's is always 100% in terms of percentage or 1 in terms of fraction.

Several models based on single polynomial interpolation have been widely used in modelling mixture systems. Some of these models are given as *Equations 2–7*.

Model 1: $Y = a_0 + ... + a_iX_i$ *Equation 2*

Model 2: $Y = a_iX_i + ... + a_{ij}X_iX_j$ *Equation 3*

Model 3:

$$Y = a_0 + ... a_iX_i + ... + a_{ijk}X_iX_jX_k \qquad \textit{Equation 4}$$

Model 4:

$$Y = a_iX_i + ... + a_{ij}X_iX_j + ... + a_{ijkl}X_iX_jX_kX_l \qquad \textit{Equation 5}$$

Model 5:

$$Y = a_0 + ... + a_iX_i + ... + a_{ij}X_iX_j + ... a_{ijkl}X_iX_jX_kX_l \qquad \textit{Equation 6}$$

Model 6:

$$Y = a_0 + ... + a_iX_i + ... + a_{ii}X_i^n + ... + a_{ij}X_iX_j + ... + a_{ijkl}X_iX_jX_kX_l \qquad \textit{Equation 7}$$

where a_0, a_i, a_{ij} and a_{ijkl} are constants that are dependent on the characteristics of individual mixture systems; $i, j, k = 1, 2, ..., n$ correspond to components 1, 2,...., n. The best model, in terms of both the convenience of data handling and the accuracy of the approximation, is Model 4. For two component mixture systems, this model can be expressed as,

$$Y = a_1X_1 + a_2X_2 + a_{12}X_1X_2 \qquad \textit{Equation 8}$$

Here, we have three constants, a_1, a_2, and a_{12}, representing the characteristics of an individual mixture system. It should be emphasised that all of the above models assume that the property developed is not dependent on the sequence of mixing of the components.

Most of the conventional single polynomial models, i.e. Models 1–6, can be used to simulate satisfactorily the relationship between performance/property-of-interest and the composition of surface coating systems having simple behavioural features, such as those shown in *Figure 1*. However, most of the conventional single polynomial models are unable to simulate the complex relationship between the properties-of-interest and the composition of the mixture, such as those represented in *Figure 2*. In both *Figures 1* and *2*, the vertical-axis represents the property-of-interest while the other axes represent the coating compositions.

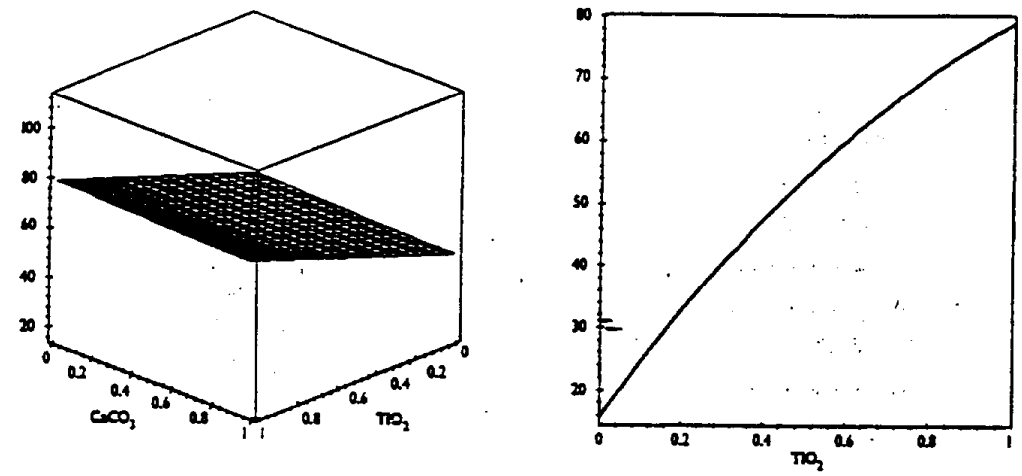


Figure 1: Typical simplistic property of interest/composition relationship

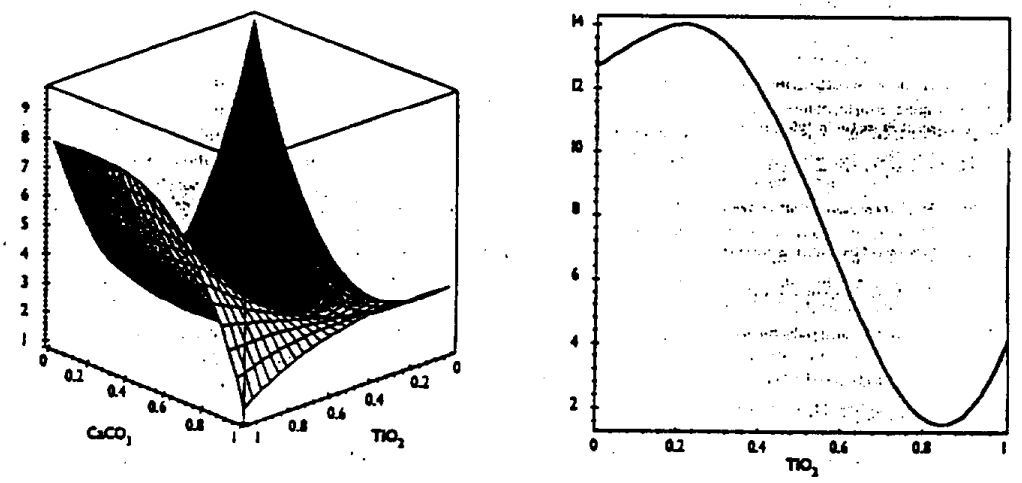


Figure 2: Typical complex property of interest/compositon relationship

Thus, our interests lie in the application of *piecewise* polynomials as a universal model for the simulation of the property-of-interest curve/surface/space of surface coating systems. Such *piecewise* polynomial model should possess continuity and flexibility over the entire composition range, i.e. from $X_i = 0$ (or 0%) to $X_i = 1$ (or 100%), $i = 1, 2, ..., n$, cubic spline interpolation being the one that is more suitable.

The adaptation of the concept of cubic spline interpolation to the simulation of a property-of-interest curve is given as follows. Taking into account N measurements for a two component mixture, where $X_2 = 1 - X_1$, the mathematical representation of the property-of-interest curve is given as

$$Y \cap Y_i(1) = a_{i1} + b_{i1}(X_1 - X_{i1}) + c_{i1}(X_1 - X_{i1})^2 + d_{i1}(X_1 - X_{i1})^3 \qquad \textit{Equation 9}$$

where $i = 1, 2, ..., N-1$. Given any number of measurements, as required by the precision needed to represent the property-of-interest data, a set of splines, interpolating the property of interest curve, can be established. A spline simulation of the property-of-interest space of a p-component coating system, taking into account of $(N_1+1)(N_2+1)...(N_p+1)$ measurements, can be given as

$$Y \cap Y_{i11} \times Y_{i21} \times ... \times Y_{ip-11} \qquad \textit{Equation 10}$$

while,

$$Y_{i11} = a_{i11} + B_{i11}(X_1 - X_{i11}) + c_{i11}(X_1 - X_{i11})^2 + d_{i11}(X_1 - X_{i11})^3. \qquad \textit{Equation 11}$$

$$Y_{i21} = a_{i21} + b_{i21}(X_2 - X_{i21}) + c_{i21}(X_2 - X_{i21})^2 + d_{i21}(X_2 - X_{i21})^3. \qquad \textit{Equation 12}$$

and so on to

$$Y_{ip-11} = a_{ip-11} + b_{ip-11}(X_{p-1} - X_{ip-11}) + c_{ip-11}(X_{p-1} - X_{ip-11})^2 + d_{ip-11}(X_{p-1} - X_{ip-11})^3. \qquad \textit{Equation 13}$$

where, $i_{11} = 1, 2, ..., N_1$; $i_{21} = 1, 2, ..., N_2$; ...

LIFELINES

- A chartered chemist, Dr. Long Lin is currently a Field Group Lecturer in the Department of Colour Chemistry at University of Leeds, where he supervises a very active Polymer and Surface Coating Science and Technology Research Group. He has over fifteen years of experience in surface coating science and technology, particularly in experimental design and data interpretation. Dr. Lin is also an active member of the Oil and Colour Chemists' Association. He is a member of the Technical Policy's Committee, the Publication's Committee and the Special Publication's Committee of OCCA.
- Prof. James Thomas Guthrie is Field Group Professor of Polymer and Surface Coatings Science, Department of Colour Chemistry at University of Leeds. He started his career as Research and Development Chemist at Transparent Paper Ltd in 1960, where he worked for eight years. In 1971 he gained his PhD from Salford. Since 1972 he has held different positions with the University of Leeds. His research interests include copolymers, composites and blends, functional polymeric agents, novel printing methods, radiation and UV curing, plastics coloration, surface characterisation and modification, dispersion stabilisation and characterisation, anticorrosion coating systems, and polymers from renewable sources.
- Dr. Weidong D. He is currently a research fellow in the Department of Colour Chemistry at Leeds University. She has many years of experience in organic synthesis, in polymer chemistry and in surface coating formulations. Dr. He has a number of patents on synthetic colorants, polymeric materials and on surface coating formulations.

$= 1, 2, ..., N_{p-1}$; $N_1, N_2, ..., N_{p-1}$, represent the number of coating formulations containing a different fraction of component 1, 2, ..., $p-1$. Terms in Y and X have the same meanings as defined previously. The evaluation of the coefficients of these splines is no more difficult than that which pertains to the case of two component mixtures.

Anticorrosive coating systems

The major coating property of concern in this study was that of anticorrosion. Anticorrosion properties are dependent on a number of other properties such as the barrier properties, the mechanical properties and the ageing properties. Thus, anticorrosion properties are demonstrated through the coating's ability to resist corrosive environments such as moisture, salt water, electrolytes, extreme temperatures, organic solvents, microorganisms and mechanical strain.

The barrier properties of a coating are mainly attributed to the degree of crosslinking of the film-formers. In this sense, a completely impermeable coating would be ideal for anticorrosion purposes. However, in reality, such coatings would normally have poor mechanical properties such as poor flexibility and brittleness. Thus, one of the coating developer's tasks is to achieve a balance between the coating's impermeability to invasive substances and the coating's mechanical properties.

The mechanical performance of coatings is demonstrated through the coating's hardness and the coating's flexibility. While coating hardness is dependent on the degree of crosslinkage of the polymeric chains, the coating flexibility is closely related to the intrinsic characteristics of individual polymer chains. Since the process of substrate corrosion starts with the penetration of the invasive medium through the coating layer, any pits or cracks in the coating layer would reduce the anticorrosion properties of the coating layer. Therefore, the coating hardness and the coating flexibility need to be adequate to ensure a long service life.

Development of a complete coating system involves several stages. Coating development usually starts with the synthesis of the core-resin precursors. This is followed by blending the core-resin precursors with pigments and assistant polymeric species to give a complete coating system. The composition of the final coating formulation determines the performance of the coating. Optimisation of coating formulation is inevitable for the development of coating systems, especially of novel coating systems.

Materials and equipment

A complete anticorrosion coating formulation typically consists of at least one core resin precursor, one assistance resin precursor and one pigment. In this study, a previously developed porphyrinogenic polymer was used as the core resin precursor. For details of the porphyrinogenic polymer, please refer to PhD thesis by *W. He* [8] and *US patent US05360884* [9]. A UCB "Ebecryl 600" epoxy resin precursor (supplied by UCB Chemical Sector, Speciality Chemicals Division, Drogenbos, Belgium) and "XH943" aliphatic polyamide resin precursor (supplied by Ciba Specialties, Duxford, Cambridge, UK) were used as the assistant resin precursors. Various pigments were used though the major emphasis was placed on the iron oxides. Two types of iron oxides were employed, namely the red oxide and the yellow oxide both of which were provided by the Kalon Group Plc., Birstall, U.K. Galvanised steel sheets (50 mm × 100 mm), supplied by Ford Motor Company, Dagenham, were used in preparation of test panels for the study reported here.

Experimental procedures

In order to optimise the anticorrosive properties of the porphyrinogenic coating system. Coating formulations containing porphyrinogenic resin precursor (40%, w/w), "Ebecryl 600" resin precursor (25%, w/w), Ciba Specialties "XH 943" (8%, w/w), butanol (8%, w/w), FeO + Fe_2O_3 (17%, w/w) (FeO/ Fe_2O_3 ratio varied) and other additives (2%) were prepared. In this paper is reported only the processes involved in optimisation of the ratio of FeO to Fe_2O_3, the total amount of FeO and Fe_2O_3 and the amount of other coating ingredients being unchanged, as given above.

The coating formulations, containing various amounts of FeO and Fe_2O_3, were applied onto galvanised steel test panels and cured, in a thermal oven, at 260 °C for 60 seconds. The dry coating film thickness was 25 μm in all cases. The cured, coated panels were subjected to various laboratory tests. The coating formulations and the test procedure are detailed as follows.

Preparation of coating formulations for the optimisation of the pigment contents

Various experiments were designed and conducted in order to provide data for the optimisation of the ratio of FeO to Fe_2O_3 in the paint formulations. In this investigation, the emphasis has been on the optimisation of the

ratio of two major pigments used in the anticorrosion coating formulations. As such, the ratio of the total amount of iron oxides to the total amount of other coating ingredients was deliberately kept constant, i.e. 17% (w/w) of the total coating formulation. The ratio of FeO to Fe_2O_3 was varied to give a series of coating formulations. A total of seven coating formulations were designed and prepared. The compositions of these coating systems, in terms of the FeO/Fe_2O_3 ratio are given in *Table 1*.

Table 1: Composition ratio of FeO/Fe_2O_3 in coating samples prepared for the optimisation of FeO/Fe_2O_3 content

	Ratio	
Sample code	FeO	Fe_2O_3
1	100	0
2	75	25
3	66.6	33.4
4	50	50
5	33.4	66.6
6	25	75
7	0	100

Test procedures

As mentioned above, several mechanical properties of coating film are related to anticorrosion performance of the coating film. These mechanical properties of interest are the hardness of the coating film, the flexibility of the coating film and the adhesion of the coating film to metallic substrate. These mechanical properties, together with the anticorrosion properties, i.e. the coating's resistance to a simulated marine corrosion environment and the coating's resistance to organic solvents, of the various coating systems were acquired experimentally. Test procedures for the acquisition of each of these properties are briefly described as follows.

Hardness test procedure - scratch resistance test

A scratch resistance test was used, in this study, to evaluate the hardness of the coatings. A pencil hardness tester is the most widely used instrument for the evaluation of coating hardness [10]. However, to conform to the specific requirements associated with this study, a standard metal probe was used in the measurement of coating hardness. The edge of the probe was drawn across the coating surface with consistent force. The coating was considered to have failed the hardness test when the whole or a part of the coating was removed.

T-bend test procedure

One of the important properties of a coating is the degree of adhesion of the coating to the substrate surface. Good adhesion contributes significantly to good anticorrosion properties. In this study, the degree of coating adhesion to the substrate surface was evaluated using T-bend tests adapted from American Standard of Test Methods, D522-93a [11].

MEK dry rub test procedure - solvent resistance test

The solvent resistance test was designed to evaluate the coating's resistance to organic solvents. In some cases, the solvent resistance tests were used to evaluate the completeness of curing, since uncured resin precursors more easily dissolve in the solvents. The procedure of solvent resistance assessment was adapted from American Standard of Test Methods:D5042-93 [12].

Salt spray test procedure

Saline resistance is one of the major anticorrosive properties. All the salt spray tests were carried out using a salt-spray unit in Materials Laboratory 13/100, Research & Engineering Centre, Ford Motor Company Limited, Laindon, Basildon, Essex, U.K. The salt spray corrosion test cabinet conditions conformed to the ASTM B117. The Ford Laboratory Test Method FLTM EU BI 103-1 was used throughout the tests.

Models based on spline interpolation give much improved simulation

The hardness (scratch resistance test), the flexibility (T-bend test) and the solvent resistance (MEK dry rub) of the cured coating samples were characterised using the procedures described above. The results, together with the relevant normalised values (details following), are detailed in *Table 2*.

The results shown in the "Observation" columns in *Table 2* were subjected to analysis using the "Expert" computer software [4]. The "expert" package is capable of simulating the experimental data using the conventional single polynomial models and the step-wise, multiple spline interpolation models. Since the computation programme requires that each property be represented as a numerical value, the observed coating hardness values were converted into numerical values. For the convenience of numerical processing, all result observations were converted into fractio... values between 0.0 and 1.0. For instance, the expected coating performance, in terms of the solvent resistance, was 50 MEK double rubs. Therefore, the 50 times of MEK double rub was set at the value of 1.0. Consequently, the MEK double rub property of the coating sample No. 2, which resisted 30 MEK double rubs was considered to be 0.6, i.e. $\frac{30}{50}$=0.6, in a 0~1 scale. The settings for the hardness were standardised as good = 1.0; fair = 0.66; intermediate = 0.33; and poor = 0.0. Similarly, the settings for the coating adhesion properties were 0T = 1.0; 2T = 0.5; and 4T = 0.0 and so on.

The normalised/standardised values of the coating properties were then input to the computation programme, "Expert", with which mathematical simulations were generated for each of the properties-of-interest, i.e. the coating's hardness, the coating's flexibility and the coating's solvent resistance. The relationships between the coating's properties-of-interest and the FeO/Fe_2O_3 composition are shown as *Figures 3~5*. The solid square symbols, in *Figures 3~5*, represent the normalised, average observation values. The dashed curves represent the simulation of the experimental data using a single polynomial model solid curves represent the simulation/p... tions by spline-based models.

Table 2: The properties of the cured coatings

	Hardness		T-bend		MEK dry rub	
Sample code	Observation	Normalised value	Observation	Normalised value	Observation (D.R. times)	Normalised value
1	Good	1	2T-3T	0.375	30	0.6
2	Good	1	2T	0.5	30	0.6
3	Poor	0	4T	0	20	0.4
4	Good	1	3T	0.25	30	0.6
5	Fair	0.33	3T	0.25	30	0.6
6	Fair	0.33	2T	0.5	20	0.4
7	Poor	0	4T	0	20	0.4

It can be seen, from *Figures 3–5*, that models based on spline interpolation give much improved simulation of the experimental data in all cases, compared to the models based on a single polynomial. Indeed, models based on single polynomial gave very poor simulation of the experimental data, coefficients of regression being 0.6522 (hardness), 0.3730 (flexibility) and 0.5586 (solvent resistance), respectively.

Reliability of the prediction by the model based on spline interpolation is confirmed

This software further predicted the compositions of FeO/Fe_2O_3 in the coating formulations that would give the optimal hardness, the optimal adhesion and the optimal solvent resistance. These were 86% FeO/14% Fe_2O_3 for optimal hardness, 86% FeO/14% Fe_2O_3 for optimal adhesion (T-bend) and 86% FeO/14% Fe_2O_3 for optimal solvent resistance, total amount of FeO/Fe_2O_3 being 17% of the total coating formulation *(Figure 6)*.

In order to verify the reliability of such prediction, a coating formulation containing FeO and Fe_2O_3 to the ratio 86% to 14% (the total amount of FeO/Fe_2O_3 constituting 17% of the total coating formulation) was prepared. This coating formulation was coated onto galvanised steel panels and cured in a preheated oven, at 260 °C for one minute. This coating sample is denoted as *Sample 8*. The coating properties were measured as hardness = Excellent, T-bend = 0T and MEK dry rub = 35. These values agree very well with the predicted optimum values as indicated in *Figure 6*.

Galvanised test panels, coated with the coating formulations containing various amount of FeO and of Fe_2O_3, i.e. Samples 1–8 (see *Table 2* and the paragraph immediately above), were subjected to salt spray tests. The results of these salt-spray tests, in terms of the presence of white corrosion product, blisters, coating detachment etc., at 100 hours, 192 hours, 480 hours and 600 hours, respectively, were recorded.

The average diameter of the blisters on the coating observed, for each test panel, at various stages of the salt spray test, is recorded in *Table 3*. The same data are graphically presented in *Figure 7*.

It can be seen, from both *Table 3* and *Figure 7*, that *Sample 8*, i.e. coating formulation containing the predicted optimal quantity of FeO/Fe_2O_3, gave the best anticorrosion per-

Figure 3: Modelling of hardness/composition relationship using single polynomial and spline interpolation

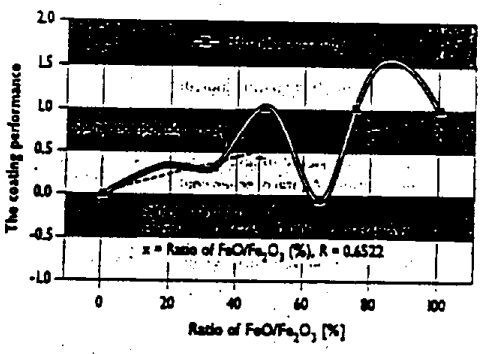


Figure 4: Modelling of flexibility/composition relationship using single polynomial and spline interpolation

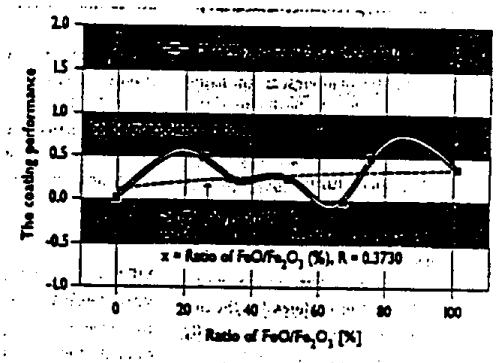


Figure 5: Modelling of solvent resistance/ composition relationship using single polynomial and spline interpolation

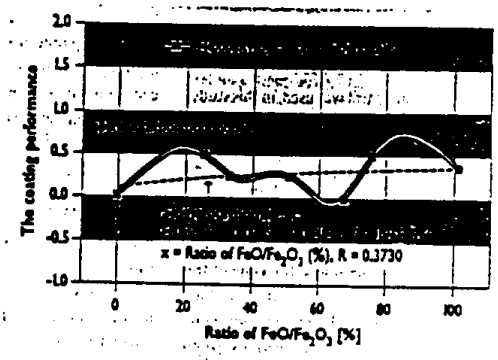
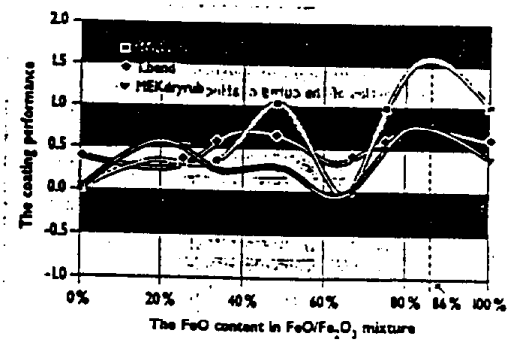


Figure 6: The prediction of optimum FeO/Fe_2O_3 composition



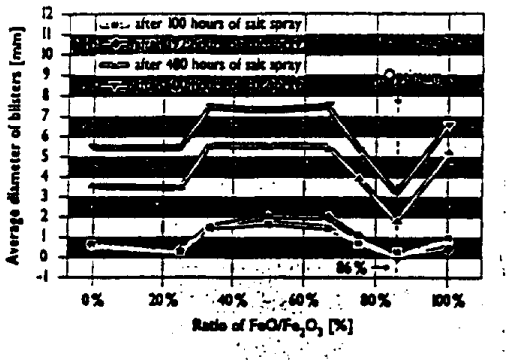


Figure 7:
Results of salt spray test

Table 3: Average diameter of blisters on coating tested by salt spray

		Average diameter of blisters on coating (mm)			
Sample code	Length of salt spray test (hr.) FeO/Fe_2O_3 (%)	100	192	480	600
7	0	0.5	0.5	3.5	5.5
6	25	0.3	0.3	3.5	5.5
5	33.3	1.5	1.5	5.5	7.5
4	50	1.75	2	5.5	7.35
3	66.6	1.5	2	5.5	7.5
2	75	0.75	1	4	5.5
8	86	0	0	1.75	3.25
1	100	0.5	0.5	5	6.5

formance. This indicates that 86%:14% (FeO/Fe_2O_3) was the optimal composition. Thus, the reliability of the prediction by the model based on spline interpolation was confirmed.

It was therefore clear that an optimal porphyrinogenic anticorrosion coating formulation would consist of 40% of porphyrinogenic resin precursor, 25% of "Ebecryl 600", 8% of "XH943", 8% butanol, 14.62% FeO, 2.38% Fe_2O_3 and 2% other additives.

Efficient optimisation of surface coatings formulations

It can be concluded from the above that the model based on spline interpolation provides a unique, efficient solution to the modelling of the properties-of-interest/compositions relationship of coating systems showing complicated behaviour. Indeed, using such model, a high degree of simulation of the experimental data can be achieved, thus allowing efficient optimisation of surface coatings formulations. ■

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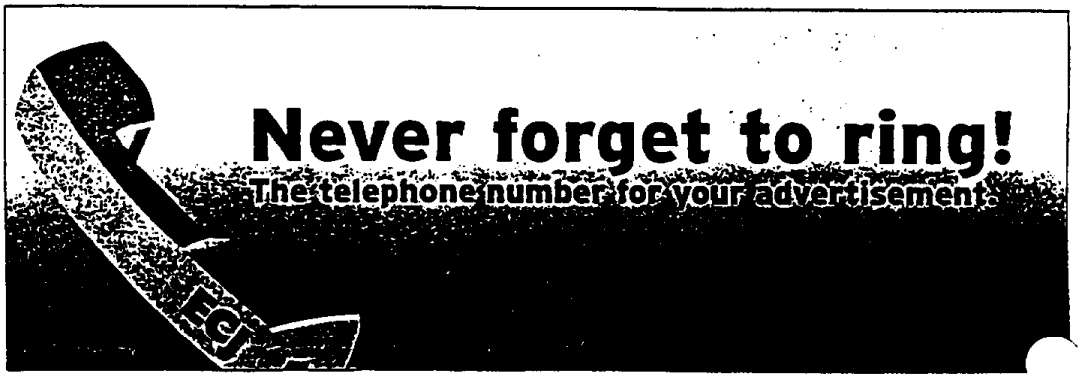

MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

April 7, 2000

Mr. Dean C. Simeroth, Chief
Criteria Pollutants Branch
Stationary Source Division
Air Resources Board
2020 L Street
P. O. Box 2815
Sacramento, California 95812

Dear Mr. Simeroth:

Multi-Agency Comments on the Suggested Control Measure for Architectural Coatings

This correspondence represents the collective comments of three public agencies to the Air Resources Board (ARB) on the February 11, 2000 Draft Program Environmental Impact Report (EIR) for the Suggested Control Measure for Architectural Coatings (SCM). The three major California public agencies represented are The Metropolitan Water District of Southern California (MWD), the California Department of Water Resources (DWR), and the California Department of Transportation (Caltrans). MWD and DWR provide water for municipal and industrial use (approximately 1.8 and 3.0 million acre-feet of water per year, respectively) and operate extensive systems of water conveyances, reservoirs, facilities, and water treatment plants. Caltrans is responsible for construction of all State and Federally designated highways throughout California. MWD and Caltrans currently have laboratories that conduct technical assessments of coatings utilized on their public structures, the results of which are often relied upon by other related public entities. The comments herein reflect our common views and concerns as affected agencies located in the state of California.

16-1 MWD, DWR and Caltrans continue to be supportive of the efforts to reduce volatile organic compound (VOC) emissions from the application of architectural coatings. We have attended the numerous workshops held to date, formally met twice with ARB representatives and have had various telephone discussions with ARB staff regarding the proposed SCM. As end-users of architectural/industrial maintenance coatings (IMC) on critical components of our public service systems, MWD, DWR and Caltrans have had concerns with respect to having sufficient time to identify and test the lower VOC IMCs to determine their adequacy to replace existing high performance coatings. The latest revisions to the SCM begin to address this concern by extending the proposed IMC effective date until January 1, 2004. While the 2004 extension will be beneficial, based on our collective laboratory experience and on preliminary testing results for the newer lower VOC coatings, we have comments regarding the basis for the compliance time frame. The specific comments and recommendations of MWD, DWR and Caltrans are provided below.

Availability and Performance of Replacement Coatings

The Draft Program EIR states that ARB staff has concluded that coatings that meet the proposed limit are technologically and commercially available and that such complying coatings perform as well as higher VOC IMCs. Information from manufacturer's product data sheets has been utilized to reach this conclusion. However, given MWD's past and recent experiences, we continue to have concerns regarding the actual performance of the lower VOC coatings.

16-2 As detailed in our July 21, 1999 comment letter, it has been MWD's past experience that approximately 80 percent of the coatings tested in its Corrosion Control Laboratory do not meet MWD's performance standards and are rejected for poor performance reasons. Also, 75 percent of the coatings tested by MWD do not meet the physical and performance characteristics stated in the manufacturer's technical product data sheets.

Preliminary results from current tests being conducted at MWD of the lower VOC coatings indicate a high rate of failure. Since the May 1999 adoption of SCAQMD Rule 1113, MWD began identifying and testing the new compliant coatings. High humidity testing of 75 coating systems (a system can consist of a primer, intermediate and/or topcoat), each represented by one-coated panel, was initiated. Passage of this test is critical for a coating to be considered for use as an IMC. Of the 75 coated panels, the preliminary results are as follows:

- After 90 days in test:

16-3
  - ✓ 16 (21 percent) are performing satisfactorily -- eight are 100 percent solids epoxy coatings that contain less than 100 g/l VOCs; four are high solids epoxy coatings that contain 100-250 g/l VOCs; and four are solvent borne epoxy and urethane coatings that contain 251-340 g/l VOCs
  - ✓ 59 (79 percent) are exhibiting signs of moderate to severe premature degradation and deterioration -- 46 contain less than 100 g/l VOCs; nine contain 100-250 g/l VOCs; and four contain 251-340 g/l VOCs.
- Coating types represented:
  - ✓ epoxy (high solids, water borne), direct to metal and top coats
  - ✓ waterborne urethanes, direct to metal and top coats
  - ✓ acrylic latex top coats
  - ✓ water based epoxy primers
- Degradation/deterioration mechanisms vary but are consistent in these areas:
  - ✓ uniform undercoat rust formation and nodules
  - ✓ top coat softening
  - ✓ osmotic blistering
  - ✓ discoloration, fading, chalking
  - ✓ loss of gloss and surface reflectance

Request for Time to Test

Based on the above-described experiences, we continue to recommend that sufficient time be provided to perform actual laboratory and field tests of new compliant coatings. While the manufacturer product information is useful in some regard, actual laboratory/field tests will be of the most significance. The
16-3 2004 time frame begins to provide this time, but is not in alignment with the current SCAQMD EPS provision that allows the use of 340 g/l VOC coatings for IMC purposes until 2006. As you are aware, a key aspect of the EPS provision is that the public agencies are to conduct a technology assessment of the new compliant coatings to demonstrate their feasibility and performance. By 2004, we anticipate that this technology assessment will produce a significant amount of critical performance data. As the information becomes available, we would like to forward it to ARB for evaluation. Therefore, we are recommending that the EPS technology assessment be formally recognized in the draft SCM (or associated Board Resolutions). Included should be a commitment by the ARB Board to review the results prior to 2004 and to take any subsequent action relative to the IMC VOC limit and effective date.

Additionally, the Draft Program EIR states that the 2004 time extension was provided to allow time for essential public service agencies to complete administrative processes before low VOC coatings can be used. While time is needed to account for our contract/bidding processes, MWD, Caltrans and DWR
16-4 requested extending the IMC effective date primarily because of the concerns related to performance and availability of satisfactory coatings as described above.

Thank you for the opportunity to comment on the Draft Program SCM and to meet with ARB representatives to discuss our collective agencies' concerns. The ARB staff efforts to balance the needs of those affected by the SCM are very much appreciated. If you have any questions regarding these comments, please contact any of the representatives identified below.

Very truly yours,

Eddie A Rigdon

Jill T. Wicke
Water System Operations Manager
Metropolitan Water District of Southern California

for

Daniel F Peterson

Daniel F. Peterson, Chief
Environmental Assessment Branch
Division of Operations and Maintenance
Department of Water Resources

Philip J. Stolarski, Chief
Division of Materials Engineering
and Testing Services
California Department of Transportation

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cc: Donald J. Ames, ARB
Barbara A. Fry, ARB
James F. Nyarady, ARB
Michael P. Jaczola, ARB
Evan Wong, ARB
Naveen Berry, SCAQMD

McKenna & Cuneo, L.L.P.
Attorneys at Law

Washington, D.C. | Denver
Los Angeles | Dallas
San Diego | Brussels

Steuart Street Tower ▪ One Market ▪ San Francisco, CA 94105-1475
415-267-4000 ▪ Fax: 415-267-4198
www.mckennacuneo.com

April 7, 2000

Via E-Mail and U. S. Mail

Carol René Brophy
415-267-4100
carol_brophy@mckennacuneo.com

Mr. James Nyarady
Manager, Strategy Evaluation Section
California Air Resources Board
2020 "L" Street
Sacramento, CA 95812

Re: California Architectural Coating Rule SCM – Comments of RPM, Inc.

Dear Mr. Nyarady:

On behalf of our client, RPM, Inc. ("RPM") and its operating companies,[1] we are providing the California Air Resources Board ("ARB") with comments on the Proposed California Architectural Coating Rule Suggested Control Measure ("SCM") dated February 11, 2000. These Comments are limited to the non-technical aspects of the rule. One of RPM's operating companies, Rust-Oleum, has commented on technical issues, including Industrial Maintenance Coating Category and ARB's proposed VOC-limits. Further, RPM endorses the comments of the 17-1 National Paint and Coatings Association ("NPCA"), of which RPM and its operating companies are members. RPM urges ARB to act on the concerns expressed by RPM, Rust-Oleum and NPCA, and to revise the SCM accordingly.

[1] RPM is a holding company that owns the stock in over 150 corporations, of which 41 are involved in the manufacture or importation of coatings that may be used for one or more applications subject to the Architectural Coating SCM. The affected companies are listed in Attachment A.

I. General Comments.

Impermissible and overly burdensome regulation of out-of-state manufacturers. As presently proposed, the SCM impermissibly shifts responsibility for attaining compliance with California's rule away from California employers and consumers who live and work in the State, and instead, places the burden for compliance on out-of-state manufacturers. The *Applicability, Definition, Labeling*, and *Reporting* provisions work together to compel manufacturers to produce, label, and market coatings that are unique not only for California as a whole, but potentially for each district in the State. We understand that the reason ARB has drafted the rule with these provisions is at the request of Enforcement. This philosophy to enforce against out-of-state manufacturers instead of Californians that inappropriately use coatings is not only unwarranted and unjust, but comes at high administrative cost to manufacturers. 17-2

The SCM is particularly onerous to small and mid-size manufacturers, such as RPM's operating companies, who produce so-called niche or specialty coatings intended for use under several rules, and not just as architectural coatings. RPM's small and mid-sized companies do not sell coating from their own retail outlets and do not have California-based sales and distribution systems, but rely on California retailers and distributors to know the rules of the districts in which they are located and to sell appropriate products for specific uses. To change our business practices and the way that we label, market and distribute our products would be prohibitively expensive. As a result, RPM's many small and mid-sized companies could not compete with large companies or in-state businesses at a competitive price. The rule and the anti-manufacturer attitude that it reflects, is likely to further reduce the number of small and mid-sized companies that do business in California.

To correct these flaws, we urge ARB to return the focus of the rule to the in-state users and retailers, and to bring the SCM into as close of conformity with the National Architectural Coating Rule as feasible. In our view there is no justification for creating California-unique coating category definitions, or requiring such categories of "intended use" to be put on product labels. Further, any reporting requirements should be made by distributors or retailers, who have direct knowledge of the products they sell in California.

Vague and ambiguous provisions. As explained more fully below, several SCM provisions are vague and ambiguous as to key provisions, especially as to the

rule the meaning of the term "manufactured for use." We request ARB to state exactly what this term means and how it the rule applies to manufacturers of products that are not "intended" solely for architectural use, and may be used legally under other coating rules in a district. By using this term in the Applicability and Definition sections of the SCM, is ARB implying that an out of state manufacturer will be liable if a product it manufactures is sold by a third
17-3 party located in California and used by a California consumer in a manner that violates the rule? We request that the clarification be made available sufficiently before the Board Hearing to give industry ample opportunity to raise potential legal issues with the Board and ARB legal staff.

The SCM is not likely to achieve the expected VOC reductions. RPM believes the SCM is not likely to achieve the predicted 11-ton per day VOC reduction, because the ARB has failed to account for the shorter life cycle of the coatings mandated. At the March 16, 2000 Workshop, several industry technical
17-4 representatives testified that the VOC levels established under the SCM would result in inferior coatings that will require more frequent maintenance. ARB staff dismissed these comments out of hand, instead deferring to a SCAQMD representatives' example of a railing that was painted with compliant coating three years ago and allegedly is still serviceable, and submittals of "proprietary data" that ARB staff has received. At the very least, ARB should state *on the record* the data on which they are relying to prove that Coatings meeting the SCM VOC levels will have the same life-cycle as present coatings.

ARB decisions improperly based on "off the record" data and communications. RPM is concerned that ARB has dismissed the testimony of industry on technical matters, and is relying on "confidential and/or proprietary" submittals that cannot be fully scrutinized by the regulated community. In
17-5 addition, ARB appears to be relying and even deferring to SCAQMD staff's opinion on numerous policy issues. This was evident at the March 16, 2000 Workshop, when on several occasions ARB staff deferred to SCAQMD staff to answer questions and to give examples to contradict testimony being offered by industry representatives.

It further appears there has been significant interagency communication on all points relevant to developing the SCM, and that the nature and extent of these communications are not reflected in the administrative record. Although ARB should communicate with and solicit comment from other governmental agencies, we believe these contacts should not be off the record, but recorded in the administrative record as to the questions asked and the information provided. We

left the March 16th Workshop with the distinct impression that ARB's staff has had extensive communication with SCAQMD staff and other governmental agencies, and was not interested in the testimony of coatings manufacturers because it had already made up its mind on most points in the rule based upon private conversations and interagency dialog to which the regulated community has not be
17-5 privy. We urge ARB to respond to the issues raised by industry, especially in regard to the VOC limits established in the SCM and the Industrial Maintenance Category, with ***objective and well reasoned explanations*** on the record. We also request that each conversation between ARB staff and other governmental agency representatives be placed in the administrative record as to the parties involved, the subject covered, and the information provided.

The cost analysis is over-simplified and does not consider the high business management costs this rule imposes on out-of-state manufacturers to comply with it. The cost analysis focuses only on the cost of "ingredients" and
17-6 fails to consider or even to identify the significant on-going costs to manufacturers of implementing sales, distribution, and accounting systems needed to collect data to file reports and products in compliance with the proposed rule.

II. Comments on Specific Provisions.

Applicability: The SCM will apply "to any person who supplies, sells, offers for sale, or manufactures ***any architectural coating for use*** within the District." RPM has the following concerns. First, the term "for use" is undefined, may cause similar problems of interpretation to those that have arisen with regard to the automotive coatings rules in several districts. What is intended by "*manufactured for use* within the District?" Must a manufacturer have "specific intent" that the coating to be used for a specific purpose? If not, what factors will ARB use to decide
17-7 if a generic or multiple use coating has been "manufactured for use in the District." Will ARB find that an out-of-state manufacturer "intended" a coating to be used in the District, merely because the coating is found for sale as an architectural coating by a third party in a District?

Second, even though coatings that are manufactured for use outside the district are exempted, there is no recognized exemption for coatings that may have legitimate use under other district rules, but may exceed the VOC limits in some possible applications under this rule. How will this be interpreted and applied?

Third, in regards to out-of-state manufacturers, RPM requests that ARB clarify what actions constitute "sells, offers for sale." Does ARB consider sales that occur out of state, to be within the scope of this rule if the product ultimately ends up in California.

RPM believes the Applicability section should be rewritten to apply to sales transactions occurring ***ONLY*** in California or out-of-state ***retail*** sales ***directly*** to
17-7 end users in California. We believe any other interpretation puts California in the position of imposing restrictions on lawful commercial transactions that occur in other states and that should be governed by the laws of the states in which they occur. Any other interpretation of the Applicability provision places the SCM in jeopardy as it is beyond the scope of ARB authority and jurisdiction.

Definitions: As a threshold matter, the coating category definitions in the SCM differ from the National Rule, but also differ from SCAQMD Rule 1113. Thus, there will be at least three architectural coating category definitions in California -- districts adopting the SCM; the South Coast Air Quality Management District
17-8 ("SCAQMD"); and districts defaulting to the National Rule. RPM believes there is absolutely no justification for such an industry-fragmenting and costly approach to the SCM. We urge ARB to use the National Rule as the model for the SCM and only depart from it where significant VOC reductions can be guaranteed with reasonable impact to the regulated community and California consumers.

The coating category definitions break from the usual format in that most (but not all) of the definitions include a requirement that the coating *"be labeled as and formulated for"* the "intended use" under the architectural coating rule. The
17-9 definition structure is inherently unclear and ambiguous. By tying the definition of a coating category to the labeling and formulation, the "intent" of the manufacturer becomes the determining factor in whether a coating is appropriate for a given use. This is a fundamental change in the philosophy of California regulations. The end-user is presumed to have no discretion to choose a particular coating for a desired use. Without stating so explicitly, the SCM mandates that coating manufacturers know every district rule, every category of coating, and indicate the appropriate categories of use on each label for every district in the State. The scheme is unworkable, as it is the intent of the California user that is dispositive of the "intended" use of a product. Manufacturers do not and should not be required to produce coatings for only one purpose or use.

Second, it is not clear what constitutes "labeled." The terms "label" or "labeled" are not defined in the SCM. Under the state and federal Occupational Health and Safety Act, which sets the standards for labels for industrial use products, and the Federal Insecticide Fungicide and Rodenticide Act ("FIFRA"), which set standards for pesticides, labeling is anything that travels through commerce with the product, whether it is affixed to the container or not. Other federal laws define label similarly. The SCM appears to take a more restricted view
17-9 of "labels", construing them to mean "container labels". As a practical matter, with the multiplicity of category definitions it may be difficult, if not impossible, to indicate the "use" of products for each California air district on an on-product label.

Further, it is not clear what is meant by the term "formulated for" the designated category. Coatings are formulated to have performance characteristics. To be economically viable, manufacturers must be able to market coatings for many purposes which share performance characteristics. ARB is regulating coatings first based upon the end-use of the coating, and secondarily by the performance characteristics. When the SCM indicates "formulated for" is it mandating that a coating manufacturer specifically formulate its coatings for the district rule at issue. Does the SCM require coating manufacturers formulate specific coatings for each district in the state, and label their products so that there will be no mistake about what uses are allowed? If this is intended, it should be stated, and the cost of this provision must be factored into the cost to industry to comply with this rule.

The requirement that manufacturers indicate uses on the label is certain to give rise to enforcement against manufacturers. With so many coating definitions, it may be extremely difficult to create a label that complies with the SCM. For so-called "generic coatings" that have uses under several rules including those that do not require labeling, the manufacturer could be considered in violation of the SCM for failing to have an architectural use indicated on the label, if the coating is sold in the district.

For the above reasons and to avoid confusion and costs, RPM requests ARB to strike the "labeled as and formulated for" phrase from the definitions in the SCM. RPM believes this provision is confusing, unworkable and unnecessary, especially in view of the labeling requirements in other provisions of the SCM.

Labeling: The SCM includes a container labeling provision, which requires:
17-10 a date code; thinning recommendations, and VOC content. In addition, there are specific requirements applicable to certain coating categories, including industrial

maintenance coatings, clear brushing lacquers, rust preventative coatings, and specialty primers. The SCM is not clear whether a coating that includes the
17-10 information required under Labeling section fully satisfies, the "labeled as" requirement in the Definition section. If additional information is required, ARB should clarify what is expected of manufacturers to comply and provide examples.

Reporting Requirements: The SCM requires that manufacturers submit an annual report to ARB concerning the amount of clear brushing lacquers, rust preventative coatings, and specialty primers sold in the state. Manufacturers must also submit a report identifying all architectural coatings that contain perchloroethylene and methylene chloride and disclosing the volumes sold. To the extent that the SCM coating definitions differ with the National Rule and the
17-11 multiple district rules, RPM believes that these reporting requirements may be difficult or impossible for an out-of-state manufacturer to comply with for the following reasons. First, it is unclear what is meant by "California sales," for the obvious reason that sales to California addresses may be exported and sales to out-of-state addresses may ultimately be used in the State. Thus, manufacturers do not have the data requested and little the ability to obtain it. ARB should impose the reporting this requirement on California distributors and retailers, who have direct knowledge of the coatings that are sold for use under this SCM in California.

III. Other Issues

Enforcement. At the Workshop, ARB indicated that the definitions and the
17-12 labeling provisions were devised at the request of Enforcement. Several industry representatives complained that if ARB was concerned about the enforceability of the rule that it should engage in a dialogue with industry regarding the best way to enforce the rule. RPM again requests that ARM work with industry to establish workable enforcement provisions.

Cost of the Rule to Industry. At the end of the workshop, ARB made a presentation concerning the method that it will use to perform the economic
17-13 analysis of the rule. ARB admits that the system that they are using emphasizes the increased cost of the raw material needed to make the paint, and minimizes the so-called one-time cost to reformulate, retool and relabel. ARB plans to get the information it needs to perform this analysis by sending industry a questionnaire. Based upon the presentation at the workshop and a quick review of the form, it appears that ARB will be missing a number of significant factors that will yield large cost impacts. For example, the cost of collecting data on California sales may

require companies to establish new and perhaps unique recording keeping and monitoring systems, if the data is to have any relevance at all. The cost of labeling and ensuring that only the appropriate coatings are sold in each district in the State is also likely to require additional manpower, and administrative systems.

17-13

RPM did not return the questionnaire, because we do not yet have adequate information on what it will cost to reformulate our coatings, and because the questionnaire did not ask for the on-going administrative cost of selling products in California and reporting the ARB.

17-14

* * * *

RPM thanks ARB for the opportunity to comment on the Draft Architectural Coating Rule SCM. We look forward to ARB's response to our the questions and requests for clarification. If you have any questions or require additional information, please contact me at the above number, or Charles Brush, Vice President Regulatory Affairs, RPM, Inc. at P.O. Box 777, Medina, OH 44258, (330) 273 8839 or cbrush@rpminc.com.

Sincerely,

Carol René Brophy
Counsel for RPM, Inc.
and its Operating Companies

Enclosure

CRB/hw
cc: Robert Burns, Bondo
Michael Murphy, Rust-oleum
Duane DeYoung, Rust-oleum
Ray Stewart, Bondo
Carlton Hanson, Bondo
Matt Stewart, DAP

RPM

Operating Companies Potentially Subject to ARB Architectural Coating Rule

(4/6/00)

Alteco Chemical S.A.

Amtred Limited

Bondo Corporation

Briner Paint Mfg. Co.

Carboline Company

Carboline U.K. Limited

Chemgrate Corporation

Chemical Coatings, Inc.

Chemrite Coatings (Pty.) Ltd. (80%)

Consolidated Coatings Corporation

DAP Canada Corp.

DAP Products Inc.

Day-Glo Color Corp.

Dryvit Systems, Inc.

Electo Coatings Ltd.

Guardian Products, Inc.

Haartz-Mason, Inc.

Kop-Coat, Inc.

Mantrose-Haeusser Co., Inc.

Martin Mathys N.V.

Mohawk Finishing Products, Inc.

Multicor S.A. Argentina I.yC. (80%)

Paramount Technical Products, Inc.

Plasite Protective Coatings, Inc.

Radiant Color N.V.

Republic Powdered Metals, Inc.

RPM/Belgium N.V.

RPM/Europe B.V.

Rust-Oleum Corporation

Rust-Oleum Netherlands B.V.

Stonhard S.A.

TCI, Inc.

The Euclid Chemical Company

The Flecto Company, Inc.

Toxement S.A.

Tremco GmbH

Tremco Incorporated

Tremco Limited

Ultra-Tex Surfaces, Inc.

Weatherproofing Technologies, Inc.

Westfield Coatings Corporation

William Zinsser & Co. Incorporated

Wm. Zinsser & Co., Inc.
173 Belmont Drive • Somerset, NJ 08875-1285 • 732-469-8100 • FAX 732-469-4539

Celebrating 150 Years
ZINSSER 1849-1999

April 7, 2000

Mr. Jim Nyarady
California Environmental Protection Agency
Air Resources Board
2020 L Street
P.O. Box 2815
Sacramento, CA 95812

RE: California Air Resources Board Suggested Control Measure for Architectural Coatings

Dear Mr. Nyarady:

Please accept the following comments to the recent Suggested Control Measure for Architectural and Industrial Maintenance Coatings (SCM) from the Air Resources Board (ARB). William Zinsser & Co., Inc. is a manufacturer of specialty primers, the mainstays of our business, and we are therefore very
18-1 interested in these proposed changes and appreciate this opportunity to give you our input. We believe the proposed 2003 changes to the ARB architectural coatings regulations, with a few changes, can be implemented without drastic negative effect on the coating industry and our business.

We have four recommendations:

1. First, that the classification for Quick Dry Primer, Sealer and Undercoater be consolidated into the
18-2 Specialty Primer category.
2. Second, that the definition of "Specialty Primer" be expanded to include additional common
18-3 problematic conditions requiring a Specialty Primer.
18-4 3. Third, that the 350 g/L VOC limit for Specialty Primers be maintained beyond 1/1/2003.
4. Fourth, that the following category title and definition be adopted.

18-3 **Category:** Specialty Primers
Definition: A quick dry primer that: **seal stains**--e.g, fire, water, graffiti; tannin, nicotine; AND **seals odors**--e.g. fire, nicotine, urine; AND **bonds to glossy surfaces** (without abrading surface)--e.g., glass, ceramic, laminates; AND **adheres to chalky painted surfaces.** The coating must dry to touch in a 1/2 hour and can be recoatable in 2 hours when tested in accordance with ASTM D1640 - 89

These recommendations are based on the following reasons:

1. The category Quick Dry Primer, Sealer and Undercoater (2.37) should be eliminated and its intention consolidated in to 2.36a Specialty Primers.

18-2 a) CARB, by including 2.37 recognizes the need for a Quick Dry Primer. We submit however, the need for quickness of dry time should not be, and often can not be, separated from other performance properties required of Primer, Sealer and Undercoater. For example: The speed of dry is part of the reason that some alkyd primers are effective in blocking stains. If they did not dry so quickly they would not block the stain. We recommend that there be only one category that encompasses both the speed of dry and specific use areas.

b) Furthermore, we recommend that the more specific title of "Specialty Primer" be adopted over the more general title, "Quick Dry Primer, Sealer and Undercoater." The term "Specialty Primer" recognizes that there are specific conditions that demand special treatment--surfaces damaged by fire (odor) and water (stains), or surfaces damaged by sunlight (chalky or friable). It is generally understood and accepted in the paint industry that such special surfaces can be primed only with special primers. Thus, our recommendation is that there be only one category, "Specialty Primers."

18-3

2. There are additional surface conditions that require a Specialty Primer and should therefore be added to category definition.

a) The CARB definition already recognizes that surfaces damaged by fire or water or that are excessively chalky need a Specialty Primer. In addition, Specialty Primers are needed to:
   - Adhere to glossy surfaces without mechanical abrasion.
   - Seal common stains--in addition to water and smoke stains, extractive wood stains, graffiti, nicotine, etc.
   - Seal odors--nicotine, wood smoke, urine, etc.

3. The VOC limit for Specialty Primers should be 350 g/L.

a) CARB's proposes reducing the allowable VOCs for Quick Dry, Primer, Sealer and Undercoaters to 200 g/L effective 1/1/2003. We believe that that this goal can not be achieved, and if implemented, would effectively eliminate solvent thinned Specialty Primers. There is not now, nor is there in the foreseeable future, technology that will produce water-based primers that could be effectively substituted for 350 g/L solvent based primers.

18-4

b) The current Federal AIM rule allows Quick Dry Primer Sealers 450 g/L VOC. The majority of Quick Dry Primer Sealers today are near this higher Federal limit. Nevertheless, we submit that the 350 g/L VOC is obtainable by 1/1/2003, without significantly sacrificing product benefits, whereas 200 g/L is not.

N.B.: Wm. Zinsser & Co., along with other primer manufacturers, currently markets a "low odor" solvent based primer formulated using resins soluble in isoparaffinic solvents. (Zinsser's product is Bulls Eye Odorless) It will not be possible to reformulate these products to the 350 g/L level. Wm. Zinsser does not believe however, that the elimination of this type of primer should prevent implementation of 350 g/L VOC limits since its only differentiating benefit is lower odor and its other benefits can be experienced with other 350 g/L primers.

We appreciate the opportunity to provide our input on this very important issue. Please let me know if we can be of any assistance or answer any questions regarding our recommendations.

Thank you for your consideration.

Sincerely,

Michael Jurist

Michael Jurist,
Director of Operations

Cc: R. Senior, Wm. Zinsser & Co.

Subject: [Fwd: Formulation Comments]
Date: Thu, 13 Apr 2000 09:59:24 -0700
From: "Barbara Fry" <bfry@arb.ca.gov> Internal
To: Jim Nyarady <jnyarady@arb.ca.gov> , Nancy Adams <nadams@arb.ca.gov>, cyoung@arb.ca.gov, eota@arb.ca.gov, ewwong@arb.ca.gov, "Paul M. Milkey" <pmilkey@arb.ca.gov> , Floyd Vergara <fvergara@arb.ca.gov>

Subject: Formulation Comments
Date: Tue, 11 Apr 2000 18:27:50 EDT
From: JHLSPC@aol.com
To: bfry@arb.ca.gov

19-1 Floor Coating: Typiocal problems associated with two component formulations - also would expect poorer performance on exterior exposure than the alkyd.

19-2 IM: Would expect the two compoinent to have poor gloss reterntion - superior alkyd resistance but significantly poorer acid recistance.

19-3 Non-Flat: Would expect poor open time.

Quick Dry: Probably would not comply to current QD specifications

19-4 QD Primers: Probably would not work on extreme chalk surfaces.

19-5 Swimming Pool: Would expect to see blistering and peeling

jhl

G & W Enterprises, Inc. dba

Trinity Coatings Company

TIME TESTED QUALITY

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Ph: 817-926-6811 • Nationwide: 800-777-5683
Adm. Fax: 817-926-9346 • Order Fax: 817-924-9661

April 12, 2000

Ms. Barbara Fry, Manager
Measures Development Section
Air Resources Board
P.O. Box 2815
Sacramento, California 95812
Ms Barbara Fry

Dear Ms. Fry,

Thank you for the time provided me by you and other ARB staff members to discuss the proposed Suggested Control Measure for Architectural Coatings. It is my hope that this visit provided some insight into the problems facing the coating industry and the consumers of these products.

20-1 The question came up about cost of reformulated lacquers to meet the 550 grams per liter requirement. The cost will vary widely based on the type of lacquer. For the type products most often used by the contractor, the raw material cost will increase some 65 to 80 cents per gallon. For some of the higher priced products the cost could remain the same or be a little less because of the acetone used to meet the V.O.C. requirement.

20-2 I hope it was made clear at our meeting that the major concern is not cost, but the ability to produce a workable product. Major problems occur when large quantities of acetone are used in a lacquer formulation. These problems include, loss of transfer efficiencies, loss of proper flow and leveling, increased danger of flash fires (because of low flash point, 0%F and wide flammability range of acetone, 2.59% to 13% of atmosphere), formula incompatibility from excess ketone solvent, blushing, and increased viscosity at application because of solvent loss during handling.

20-3 Included in this letter are six examples, three lower cost utility lacquers and three higher quality performance lacquers. In these groups are two formulas that have V.O.C. limits of 550 gr/lt in the can using the calculation method used to calculate V.O.C. in low solids coatings. If this method were used lacquers could be formulated with performance properties close to those of more conventional lacquers.

20-4 Nitrocellulose lacquers begin to disappear at a V.O.C. level of around 670 to 700 gr/lt without use of exempt solvents. Lower V.O.C. coatings using exempt solvents compromise proper solvent balance. Because of the problems stated I would ask that you consider a calculation method using the same procedure used to calculate low solid coatings and a V.O.C. limit of 550 gr/lt as packaged.

20-5 Regarding Industrial Maintenance coatings, the rules as written virtually eliminates the use of alkyds for primers & enamels. Because of the wide scope of this category, alkyd based coatings should not be eliminated. The loss of alkyd coatings will cause performance problems in some maintenance applications. There are no products presently available that perform as well as alkyds on poorly prepared surfaces. Many applications of waterborne acrylics would require an alkyd primer to perform well. Plural component products work well for their intended purpose, but they are not suitable as a general purpose coating.

20-6 The current Federal AIM rule would allows the manufacture of a quality industrial maintenance coatings. If you intend to keep all types of Industrial Maintenance coatings lumped together a more realistic number other than 250 gr/lt would be necessary. An alternative would be to break alkyd primers and enamels out to specific categories with V.O.C. contents that allow these essential coatings to exist.

20-7 One other area that needs attention is the non-flat coatings category. To produce a high quality waterborne acrylic requires a V.O.C. content over 200 gr/lt. and waterborne alkyds may run over 300 gr/lt.

20-8 The rule as written has many problem areas. The loss of so many coating systems could be very damaging. Coatings that have worked well will be lost. In most cases the replacement products will have no history of performance.

Included is information on lacquers that we discussed. If I can be of some help or provide more information, please let me know.

Respectfully,

Richard D. Williamson
Senior Vice-President
Trinity Coatings Company

Enclosures (3)

Trinity Coatings Co.
Richard Williamson
April 11, 2000

	UTILITY LACQUERS			PERFORMANCE LACQUERS		
	National 680	550 In Can	550 Less Water & Exempt Solvents	National 680	550 In Can	550 Less Water & Exempt Solvents
Acetone	0	81	298	0	100	315
Hydrocarbon	370	352	52	194	194	8
Ketone	57	24	20	197	96	42
Alcohol	66	56	53	64	64	51
Ester	36	16	166	101	101	119
Glycol Ether	14	14	10	0	0	17
Resin 1	169	169	0	0	0	0
Resin 2	0	0	141	0	0	0
Resin 3	0	0	0	119	119	112
Nitrocellulose	25	25	50	67	67	65
Additives	32	32	48	22	22	24

Formula Key :	F-NATIONAL 680	F-550 IN CAN	F-550 LESS W & E
TOTAL WEIGHT :	770.15	770.15	746.0
TOTAL VOLUME :	100.218	100.806	100.00
STD. COST/POUND:	0.410	0.400	0.510
STD. COST/GAL :	3.150	3.058	3.809
TOTAL VEH WT% :	100.000	100.000	100.000
TOTAL VEH VOL% :	100.000	100.000	100.000
PIGMENT WT% :	0.000	0.000	0.000
PIGMENT VOL% :	0.000	0.000	0.000
VOLATILE WT% :	70.589	70.589	71.432
VOLATILE VOL% :	76.602	76.738	78.247
ORG. SOLV. WT% :	70.589	60.026	35.871
ORG. SOLV. VOL%:	76.602	64.483	37.957
SOLIDS WT% :	29.411	29.411	28.568
SOLIDS VOL% :	23.398	23.262	21.753
VEH SOLIDS WT% :	29.411	29.411	28.568
VEH SOLIDS VOL%:	23.398	23.262	21.753
DENSITY :	7.685	7.640	7.461
SPEC. GRAVITY :	0.923	0.918	0.896
BULKING FACTOR :	0.130	0.131	0.134
P.V.C.% :	0.000	0.000	0.000
P/B RATIO :	0.000	0.000	0.000
SPREAD @ 1 MIL :	375.309	373.119	348.920
CPSFA @ 1 MIL :	0.0084	0.0082	0.010
G/L LESS EXEMPT:	650.030	626.287	537.082
VOC G/L :	650.030	549.535	320.694
L/G LESS EXEMPT:	5.425	5.226	4.482
VOC LB/GL :	5.425	4.586	2.676

Formula Key :	F- NATIONAL 680	F- 550 IN CAN	F- 550 LESS W & E
OTAL WEIGHT :	765.24	765.24	754.91
TOTAL VOLUME :	100.000	100.207	100.021
STD. COST/POUND:	0.597	0.583	0.604
STD. COST/GAL :	4.568	4.450	4.557
TOTAL VEH WT% :	100.000	100.000	100.000
TOTAL VEH VOL% :	100.000	100.000	100.000
PIGMENT WT% :	0.000	0.000	0.000
PIGMENT VOL% :	0.000	0.000	0.000
VOLATILE WT% :	72.723	72.723	73.120
VOLATILE VOL% :	79.944	79.985	80.504
ORG. SOLV. WT% :	72.723	59.655	31.403
ORG. SOLV. VOL%:	79.944	64.831	32.691
SOLIDS WT% :	27.277	27.277	26.880
SOLIDS VOL% :	20.056	20.015	19.496
VEH SOLIDS WT% :	27.277	27.277	26.880
VEH SOLIDS VOL%:	20.056	20.015	19.496
DENSITY :	7.652	7.637	7.548
SPEC. GRAVITY :	0.919	0.917	0.906
BULKING FACTOR :	0.131	0.131	0.132
P.V.C.% :	0.000	0.000	0.000
P/B RATIO :	0.000	0.000	0.000
SPREAD @ 1 MIL :	321.703	321.037	312.708
SPSFA @ 1 MIL :	0.0142	0.0139	0.0146
G/L LESS EXEMPT:	666.866	643.401	544.240
VOC G/L :	666.866	545.896	284.019
L/G LESS EXEMPT:	5.565	5.369	4.542
VOC LB/GL :	5.565	4.556	2.370

TROPICAL ASPHALT

14435 Macaw Street, La Mirada, Ca 90638

Toll Free 877-827-2622 * 714-739-1408 * Fax 714-670-1605

April 11, 2000

Mr. Jim Nyarady
California Air Resources Board
2020 "L" Street
P.O. Box 2815
Sacramento, California 95812

Reference: VOC content of Bituminous Roof Coatings

Dear Mr. Nyarady,

We apologize for not being able to appear with my fellow coating manufacturers at your hearing on Thursday, April 13, 2000 because of a previous commitment.

Tropical Asphalt is a manufacturer of both solvent-based and water-based roof coatings, cements and adhesives similar to Henry Company and Gardner Asphalt Corporation. Our primary customer base is the professional roofing contractor. We purchased the assets of Pacific Asphalt Corporation on September 1, 1998, who was in business in La Mirada, California for over 25 years. Our parent company, Tropical Asphalt Products Corporation is in Hallandale, Florida and has been in business for over 40 years.

21-1 We want to express our concern at your proposal to take the VOC level of bituminous coatings to 250 grams per liter, from the current 300 standard. This change will drastically reduce the workability of our coatings, especially at cold temperatures. The lower VOC will cause an increase in viscosity and will make the products much more difficult to use. It will severely alter our formulations and threaten our existence.

21-2 An even more oppressive proposal is your intention to reduce bituminous primers to 200-grams-per-liter. A requirement of 200 grams per liter would be the end of solvent-based primers. Exempt solvents are not workable. Only water based or acrylic primers would be possible and they have restrictions. Water based primers do not penetrate or wet surfaces properly. In addition, our industry ASTM standards would be destroyed. We believe the roofing community would either stop using primer, or blend their "own materials" on the job site which could potentially create a larger VOC problem.

21-1 & 21-2 In summary, we believe that the standards should remain where they currently are and that instituting your proposed new reduced standards would severely damage our industry.

Sincerely,

Bruce J. Hoberg
Vice President & General Manager
Tropical Asphalt L.L.C.

14435 Macaw Street, La Mirada, California 90638 * 877-827-2622 * 714-670-1605 Fax