BOARD MEETING DATE: December 5, 2003 AGENDA NO. 29

PROPOSAL: Amend Rule 1113 - Architectural Coatings

SYNOPSIS: The proposed amendments to Rule 1113 will further reduce VOC emissions from architectural coatings by setting future effective limits for several specialty coating categories, and will implement the coatings portion of Control Measure CTS-07 of the 2003 Air Quality Management Plan (AQMP).

COMMITTEE: Stationary Source, September 26, 2003, October 24, 2003, November 21, 2003 Reviewed

RECOMMENDED ACTION:

Adopt the attached resolution:

1. Certifying the Final Environmental Assessment (EA) for Proposed Amended Rule 1113 – Architectural Coatings, and
2. Adopting proposed amendments to Rule 1113 – Architectural Coatings.

Barry R. Wallerstein, D. Env.
Executive Officer

EC:LT:LB

Background

Architectural coatings are one of the largest non-mobile sources of VOC emissions in the South Coast Air Quality Management District (AQMD). Rule 1113 is applicable to manufacturers, distributors, and end-users of architectural coatings. These coatings are used to enhance the appearance of and to protect homes, office buildings, factories and other structures, and their appurtenances on a variety of substrates. The coatings may be applied primarily by brush, roller, or spray guns; and those applying those coatings include homeowners, painting contractors, or maintenance personnel. Rule 1113 was first adopted in 1977, and has undergone numerous amendments since then.

PAR 1113 – Architectural Coatings has been developed to implement Phase III of Control Measure CTS-07 of the 2003 AQMP and the federally approved 1999 Amendment to the 1997 Ozone SIP Revision for the South Coast Air Basin. In addition as part of a federal consent decree between the AQMD and the Natural Resources Defense Council, the Coalition for Clean air and Communities for a Better Environment, the AQMD is required to implement CTS-07 (P3). The control measure proposes to further reduce VOC emissions from various architectural coating categories and thinning and cleanup solvents used in the architectural and industrial maintenance coating industry. The reduction in VOC emissions from the use of cleanup solvents to implement CTS-07 was addressed in a separate amendment to Rule 1171 - Solvent Cleaning Operations on November 7, 2003.

Rule 1113 was last amended on December 6, 2002 to re-adopt court invalidated May 1999 amendments.

Also, following the May 14, 1999 amendments to Rule 1113, CARB developed a suggested control measure (SCM) for architectural coatings that was largely based on the interim VOC limits and the averaging provision of Rule 1113 as adopted in May 1999. The SCM, which has January 1, 2003 as the main compliance date for most coating categories and January 1, 2004 for industrial maintenance coatings, has been adopted by 22 of the 35 local air districts in California that have an architectural coating rule.

Proposal

The proposed amendments will lower the current VOC limit for the following specialty coating categories: clear wood finishes including varnishes and sanding sealers, roof coatings, stains, and waterproofing sealers including concrete and masonry sealers. The proposed VOC limits and effective dates are as follows:

- January 1, 2005 for roof coatings (EPA Energy Star certified roof coatings of 100 g/l or less can be sold until January 1, 2007)
- July 1, 2006 for clear wood finishes and waterproofing sealers
- July 1, 2007 for exterior stains

The exemption for quart containers or less from having a VOC limit is proposed to be eliminated for the coating category of clear wood finishes, effective July 1, 2006. Based on comments from industry, staff has also included an alternate proposal for your consideration that phases out the exemption in July 1, 2008, and in the interim, establishes maximum VOC limits for clear wood coatings in those containers.

The staff recommendation to eliminate the exemption in 2006 and the alternative proposal to phase it out in 2008 are Version 1 and Version 2, respectively, of the proposed rule in

Attachment F. Additional amendments include expansion of coating categories allowed to participate in the Averaging Compliance Option, clarification of coating categorization, an addition of varnish to the technology assessment requirement, expansion of the small manufacturer's exemption and other minor administrative amendments.

Emission Inventory and Emission Reduction
The emission inventory of architectural coatings is calculated from the CARB 2001 Architectural Coatings Survey. The survey is based on reported sales of architectural coatings in California. The share of statewide sales in the AQMD is based upon the percentage of the California population within the AQMD jurisdiction. The inventory for the AQMD was determined to be 5.53 tons per day of VOC for the coating categories proposed for amendment.

The emission reductions are also determined from the survey data by calculating the expected emissions on a solids basis as if all coatings comply with the proposed limits and comparing that to the current inventory. The difference is the emission reduction and it is expected to be 3.73 tons per day of VOC.

Cost-Effectiveness
Staff has estimated the cost-effectiveness to be in the range of $4,229 to $11,405 per ton of VOC reduced. The low end of the range was determined based on the retail cost of compliant coatings reported by coating manufacturers surveyed by staff. The upper end of the range was derived by estimating the increased cost at the retail level due to the increase in cost of raw materials, reformulation, testing and packaging a new product prior to commercialization. The range of cost-effectiveness is within that for other VOC rules adopted by the AQMD Board.

Issues
There are a number of specific comments that have been addressed in the Final Staff Report and Attachment D. The issues fall into three major categories. These are availability of compliant products, time for manufacturers to reformulate existing products into compliant products and elimination of the small container exemption. The proposed limits are based upon coatings currently available in the marketplace. Based upon the CARB 2001 Survey data, there are many compliant coatings offered by many manufacturers for each category and the current market penetration based on sales ranges from eleven percent for stains to fifty-one percent for roof coatings. Notwithstanding, staff is recommending a 2 ½ to 3 ½ year future effective date for most of the categories to allow other manufacturers time to develop additional compliant products. In addition, manufacturers will have an additional three-year product sell through period and the Averaging Compliance Option that can provide additional flexibility to transition to compliant products.

Regarding the small container exemption for clear wood finishes, there appears to be no justification for such an unlimited exemption and its continuance is actually counter-productive to air quality goals. The CARB Survey data indicates a relatively high percentage of sales of products complying with the proposed limits in the larger containers. However, quite the opposite is true for sales in the smaller containers. A large percentage of products sold in the small containers do not even meet current limits that would otherwise be applicable except for the small container exemption. To further compound the matter more than 40% of total gallonage sold of clear wood finishes is in small containers and, based upon small container sales reported to the AQMD, the volume of these small container sales has increased significantly in the last two years. Elimination of the exemption alone for clear wood finishes will achieve close to a ton per day of emission reductions. Staff has prepared two proposals to deal with this small container exemption. The first proposal eliminates the exemption for small container clear wood finishes effective July 1, 2006. The alternative proposal provides an additional two-years for the phase out of the exemption with interim VOC limits for those clear wood finishes sold in small containers.

CEQA

Pursuant to the CEQA and AQMD Rule 110, AQMD has prepared an EA for the proposed amendments to Rule 1113. The Draft EA finding no significant impacts was circulated for a 30-day public review and comment period from September 25, 2003 to October 24, 2003. Three comment letters were received on the Draft EA and responses to the comment letters have been incorporated into the Final EA for the proposed project.

Socioeconomic Analysis

Proposed amendments to Rule 1113 would potentially impact manufacturers and end users of architectural coatings. The former belongs to the industry of chemical and allied products (SIC 2851 or NAICS 325510), and the latter are a part of the industry of painting and paper hanging (SIC 1721 or NAICS 235210) and do-it-yourself consumers and homeowners. The total annualized cost of the proposed amendments is projected to be $14.76 million using the high-end cost estimate. It is estimated that approximately 503 jobs could be forgone annually from the future projected growth in the four-county area between 2005 and 2020.

AQMP and Legal Mandates

The 2003 AQMP estimates architectural coating emissions for the Summer Planning Inventory at 60.0 tons per day in 1997, reducing to 28.3 tpd by the year 2010 without additional controls on architectural coatings. Control Measure CTS-07 was included in the 1994 and 1997 AQMPs as well as the 1999 amendment to the 1997 Ozone SIP. This control measure proposed to reduce the VOC emissions through the establishment of lower VOC-limits and the expansion of the applicability of Rule 1113. At that time, the proposed reduction target for this control measure was set at 75 percent. Control Measure

CTS-07 has been implemented, in part, with the amendments to Rule 1113 in 1996 and 2002 which have achieved greater than 50 percent emission reduction from this source category.

These proposed Rule 1113 amendments will implement a portion of Phase III of the control measure. The current proposal primarily relies on commercially available low-VOC formulations for clear wood finishes, roof coatings, stains, and waterproofing sealers already being sold and used in the market place. The currently available resins systems can be used to reformulate existing coatings within the 13 month to 42 month implementation period.

Implementations and Resources

Existing AQMD resources will be sufficient to implement the proposed changes to this rule with minimal impact on the budget.

Attachments

A. Summary of Proposed Amendment
B. Rule Development Flow Chart
C. Key Contacts
D. Key Issues and Responses
E. Resolution
F. Rule Language
G. Staff Report
   Appendix A – List of Available Products
   Appendix B – Emissions Calculations
   Appendix C – Comparative Analysis
   Appendix D – Comment Letters Received and Responses to Comments
   Appendix E – Technical Data Sheets and Material Safety Data Sheets
H. Socioeconomic Report
I. CEQA

ATTACHMENT A

Summary Of Proposed Amendments to Rule 1113 – Architectural Coatings
Staff proposes amending Rule 1113 as follows: • Add or modify definitions. • Reduce the VOC content limits to become effective for the following coating categories: – Roof coatings January 1, 2005 (USEPA Energy Star certified coatings of 100 g/l or less could be sold until January 1, 2007) – Clear wood finishes, including varnishes and sanding sealers July 1, 2006 – Waterproofing sealers, including concrete/masonry sealers July 1, 2006 – Stains other than interior stains July 1, 2007. • Clarify the conditions under which a coating is subject to the most restrictive VOC standard. • Expand the scope of the Averaging Compliance Option to include the categories that are proposed for a change of VOC limits. • Modify administrative requirements, including consolidation of administrative requirements in other sections of the rule, to this subdivision. • Add varnishes to the technology assessment for July 1, 2005. • Delete and modify certain exemptions, including the elimination of the small container exemption for clear wood finishes and expansion of the small manufacturer's exemption.

ATTACHMENT B

RULE DEVELOPMENT PROCESS

PROPOSED AMENDED RULE 1113 - Architectural Coatings

Initial Rule Development
First Meeting: January 15, 2003

→

Working Group Meetings
(Including Teleconferences)

March 20, 2003, May 6, 2003, July 16, 2003
August 19, 2003, September 30, 2003

↓

Public Workshop and California Environmental Quality Act (CEQA) Scoping Session: September 4, 2003

Public Notice in Newspapers

9,300 notices mailed for workshop

↓

California Environmental Quality Act
(CEQA) Draft Environmental Assessment
30-Day Public Review Period
September 25, 2003 to October 24, 2003

↓

Public Consultation Meeting: October 16, 2003

Public Notice in Newspapers

9,300 notices mailed for workshop

↓

Set Hearing: November 7, 2003

Public Hearing: December 5, 2003

Notice Published and mailed for Public Hearing
November 4, 2003

ATTACHMENT C

KEY CONTACTS LIST	
Bert Adams	Glaze N Seal
Tony Garcia	Hill Brothers Chemical Company
Barry Barman	KTA-TATOR, Inc.
Paul Beemer	Henry Company
Howard Berman	Environmental Mediation, Inc.
Mike Butler	BEHR Process Corporation
Larry Cerenzie	FSC Coatings
Curtis Coleman	Law Offices of Curtis L. Coleman
Bob Dooley	Degussa Corporation
David Sibbrel	Life Paint
Claude Florent	Rainguard
Bob Floriani	ICI Dulux Sinclair
Yvonne Fong	USEPA
Dave Fuhr	Fuhr International
Barbara Fry	CARB
Lloyd Haanstra	DEFT
Madelyn Harding	Sherwin-Williams Company
Richard Hart	JFB Hart Coatings
Robert Henderson	EPMAR
Tony Hobbs	Tnemec Corporation
Mike Jaczola	CARB
Barry Jenkin	Benjamin Moore Paints
Jim Kantola	ICI Dulux Sinclair
John Knox	JFB Hart Coatings
Carol Yip Kaufman	MWD
Brian Paich	Sierra Performance Coatings/Rust-Oleum
John Long	Vista Paint Corporation
Tom Marsden	Disneyland Resort
John Means	Universal Studios
Mike Murphy	Rust-Oleum Corporation
Stephen Murphy	Murphy Industrial Coatings
Bob Nelson	National Paint & Coatings Association
Wayne Nelson	Spectra-Tone Paint Corporation
Jim Nyarady	CARB
Andy Rogerson	Caltrans
Raymond Russell	Smiland Paint Company

KEY CONTACTS LIST	
Jim Sell	**NPCA**
Bob Steel	**SICC**
Gerald Thompson	**BonaKemi USA, Inc.**
John Wallace	**MWD**
Robert Wendoll	**Dunn-Edwards Paints**
Kevin Worrall	**Texture Coatings of America, Inc.**

ATTACHMENT D

KEY ISSUES AND RESPONSES Rule 1113	
Issue	Response
Objection to the elimination of the small container exemption for clear wood finishes.	Staff believes there are adequate substitute products currently available for lacquers, sanding sealers and varnishes, that are compliant with the proposed VOC limit. Staff's proposal is to eliminate the small container exemption effective July 1, 2006. An alternative proposal will eliminate the small container exemption effective July 1, 2008, with interim VOC limits for those coatings beginning July 1, 2006..
Reformulating semi-transparent stains intended for horizontal surfaces and testing them by the proposed implementation date. Stains should be split into horizontal and vertical categories with different VOC limits, since stains applied to horizontal surfaces need to be more abrasion resistant.	Staff has revised the original proposal to make the implementation date effective July 1, 2007 providing for 42 months to reformulate, allow for laboratory testing, real time exposure testing and commercialize the reformulated stains. Splitting the category into vertical vs. horizontal application with different VOC limits would be practically unenforceable. In addition some people may substitute the lower-VOC stain with a higher-VOC stain. The AVES study for both horizontal and vertical application indicates that clear and semi-transparent stains that comply with the proposed VOC limit can be formulated. Staff has also identified stains for horizontal application, compliant with the proposed VOC limit, that are commercially available and in use.
Waterproofing concrete/masonry sealers should remain a separate category with a 400 g/l VOC. The waterborne coatings in this category do not meet the National Cooperative Highway Research requirements.	Low-VOC technology has been developed that meets all the performance requirements for waterproofing concrete and masonry sealers at the proposed VOC limit of 100 g/l. Appendix A of the Draft Staff Report lists penetrating and film-forming waterproofing concrete/masonry sealers that meet or exceed the performance standards listed in the National Cooperative Highway Research Program (NCHRP) 244. The proposed amended rule is not eliminating waterproofing concrete/masonry sealers category, but is simply requiring formulations based on the latest, high performance resin systems currently available, as indicated by the large number of compliant products already in the marketplace.

KEY ISSUES AND RESPONSES Rule 1113	
A concern that a product formulated and labeled for a specialty coating category could be required to meet the lower VOC limit of another category such as a flat coating, nonflat coating or a primer-sealer-undercoater.	Language has been modified so that if a coating meets the definition of the specialty coatings, is labeled correctly and is recommended for the intended use, it will be categorized as the specialty coating.
Concern with the initially proposed implementation date for lower VOC limits.	To allow for reformulation and testing, the effective dates for implementation of the lower VOC limits are January 1, 2005 for roof coatings, July 1, 2006 for clear wood finishes and waterproofing sealers, and July 1, 2007 for stains providing upto 42 months for compliance.
Energy Star certified aluminum containing Roof Coatings currently would require reformulation to meet the proposed lower VOC limit and will need additional time for recertification. Waterborne aluminum roof coatings can have chemical reactions that produce hydrogen gas.	Roof coatings with a VOC content of 100 g/l or less and certified under the USEPA Energy Star Program will be exempt until January 1, 2007. Additives are available to minimize excessive pressure buildup and oxidation of the aluminum flakes. To alleviate pressure build up some manufacturers equip their containers with pressure relief valves.
Field touch-up of prefabricated architectural components should be allowed to use the same coatings applied in shop application.	Staff appreciates the small quantity of coatings needed for these small touch-up and repair applications and encourages the commentator to utilize the Averaging Compliance Option of Rule 1113, which was designed for these types of specific needs for small volume coatings with higher VOC than the current limit.
The restriction of industrial maintenance coatings for residential use.	An industrial maintenance (IM) coating is formulated to meet specified extreme environmental conditions that industry has previously raised as a health concern regarding the use of this category by untrained homeowners, which they have not formally retracted. In addition, the federal Architectural Industrial Maintenance rule and the State SCM require an IM coating label to display one of the following: not for residential use, for industrial use only, for professional use only, or not intended for residential use. If a manufacturer has IM products formulated on standard solventborne or waterborne chemistry and the health risks are no different than those for their standard products; then it becomes a labeling issue, not whether an IM coating can be used for residential application.

A T T A C H M E N T E

RESOLUTION FOR

PROPOSED AMENDED RULE 1113 - ARCHITECTURAL COATINGS

RESOLUTION NO. 2003-xx

A Resolution of the Governing Board of the South Coast Air Quality Management District ("AQMD") certifying the Final Environmental Assessment prepared for Proposed Amended Rule 1113.

A Resolution of the AQMD Governing Board adopting Amended Rule 1113 - Architectural Coatings.

WHEREAS, the AQMD Governing Board finds and determines that the proposed amendments to Rule 1113 - Architectural Coatings, are considered a "project" pursuant to the California Environmental Quality Act (CEQA); and

WHEREAS, the AQMD has had its regulatory program certified pursuant to Public Resources Code Section 21080.5 and has conducted CEQA review and analysis pursuant to such program (Rule 110); and

WHEREAS, the 2003 AQMP contains Control Measure #CTS-07, and the federally approved 1999 Amendment to the 1997 Ozone SIP Revision for the South Coast Air Basin, as well as the federal consent decree between the AQMD and the Natural Resources Defense Council, the Coalition for Clean air and Communities for a Better Environment, requires the AQMD to implement CTS-07 (P3), which Proposed Amended Rule 1113 implements, for which a program Environmental Impact Report (EIR) was prepared and certified; and

WHEREAS, the AQMD staff prepared a program Environmental Assessment (EA) setting forth the potential environmental consequences of adopting Proposed Amended Rule 1113 - Architectural Coatings and was released for public review; and

WHEREAS, the program EA for the 2003 AQMP was incorporated by reference by the Draft EA to deal with regional influences, secondary effects, cumulative impacts, broad alternatives, and other factors that apply to the program as a whole; and

WHEREAS, it is necessary that the adequacy of the EA be determined by the AQMD Governing Board prior to its certification; and

WHEREAS, three comment letters were received commenting on the Draft EA; and

WHEREAS, the Draft EA has been revised and responses to comments have been prepared such that it is now a Final EA; and

WHEREAS, the Final EA has been completed in compliance with CEQA and Rule 110; and

WHEREAS, the Final EA concluded that the proposed project resulted in no significant impacts, and as a result no new effects could occur or new mitigation measures would be required; and

WHEREAS, a Mitigation Monitoring Plan pursuant to Public Resources Code Section 21081.6 has not been prepared since no mitigation measures are necessary; and

WHEREAS, the staff report, the Final EA and the Socioeconomic Impact Analysis, this December 5, 2003 Board letter, and other supporting documentation was presented to the AQMD Governing Board and that the Board has reviewed and considered the entirety of this information prior to approving the project; and

WHEREAS, the AQMD Governing Board obtains its authority to adopt, amend, or repeal rules and regulations from Sections 39002, 40000, 40001, 40440, 40441, 40702, and 41508 of the California Health and Safety Code; and

WHEREAS, the AQMD Governing Board has determined that a need exists to amend Rule 1113 - Architectural Coatings to achieve further VOC emission reductions for architectural coatings, in accordance with the 2003 AQMP and 1999 AQMP Control Measure #CTS-07 and the terms of the 1999 federal consent decree with the Coalition for Clean Air et al; and that all achieved VOC emission reductions shall be devoted to meeting the latter requirement; and

WHEREAS, the AQMD Governing Board has determined that Rule 1113 - Architectural Coatings, as proposed to be amended, is written and displayed so that its meaning can be easily understood by persons directly affected by them; and

WHEREAS, the AQMD Governing Board has determined that Rule 1113 - Architectural Coatings, as proposed to be amended, is in harmony with, and not in conflict with, or contradictory to, existing statutes, court decisions, or state or federal regulations; and

WHEREAS, the AQMD Governing Board has determined that Rule 1113 - Architectural Coatings, as proposed to be amended, does not impose the same requirements as any existing state or federal regulation, and the proposed amended rule is necessary and proper to execute the powers and duties granted to, and imposed upon, the AQMD; and

WHEREAS, the AQMD Governing Board in amending the regulation, references the following statutes which the AQMD hereby implements, interprets or makes specific: Health and Safety Code Sections 40001 (a) (air quality standards), 40440(a) (rules to carry out plan), 40440 (b) (BARCT), 40440 (c) (cost effectiveness), 40702 (adopt regulation to execute duties), and Federal Clean Air Act Sections 116 and 172 (c)(1); and

WHEREAS, the AQMD Governing Board determines that there is a problem that Proposed Amended Rule 1113 - Architectural Coatings will alleviate, (i.e., the South Coast Air Basin does not meet state or federal standards for ozone) and the proposed amendment will promote the attainment or maintenance of such air quality standards; and

WHEREAS, the AQMD Governing Board has determined that Proposed Amended Rule 1113 - Architectural Coatings should be adopted because the proposed amended rule provides the best balance between cost-effectiveness and air quality benefits; and

WHEREAS, the AQMD Governing Board has determined that the Socioeconomic Impact Assessment is consistent with the provisions of the March 17, 1989 and October 14, 1994, Board Resolution for rule adoption and Health and Safety Code Sections 40440.8, 40728.5 and 40920.6; and

WHEREAS, the AQMD Governing Board has reviewed and considered the staff's findings related to cost and employment impacts of Proposed Rule 1113 – Architectural Coatings set forth in the socioeconomic impact assessment made public with the agenda package for this meeting, and hereby finds and determines that cost and employment impacts are as set forth in that assessment; and

WHEREAS, the AQMD Governing Board has determined that the proposed amendments to Rule 1113 - Architectural Coatings will result in increased costs to industry, yet are considered cost effective with a cost effectiveness as described in the Socioeconomic Impact Assessment; and

WHEREAS, the Socioeconomic Impact Assessment further presents incremental cost effectiveness data between an alternative and the proposed rule; and

WHEREAS, the AQMD Governing Board has actively considered the Socioeconomic Impact Assessment and has made a good faith effort to minimize such impacts; and

WHEREAS, the proposed amendments to Rule 1113 - Architectural Coatings help achieve the maximum feasible emission reduction of VOCs from the various coating categories, which is estimated to be up to 3.73 tons/day, and that even after considering the Socioeconomic Impact Assessment, the adoption of such amendments is necessary for achieving the federal and state standards for ozone and for implementing the AQMP; and

WHEREAS, a public hearing has been properly noticed in accordance with all provisions of Health and Safety Code, Section 40725; and

WHEREAS, the AQMD Governing Board has held a public hearing in accordance with all provisions of law; and

WHEREAS, the AQMD specifies the manager of Rule 1113 as the custodian of the documents or other materials which constitute the record of proceedings upon which the adoption of this proposed amendment is based, which are located at the

South Coast Air Quality Management District, 21865 Copley Drive, Diamond Bar, California.

WHEREAS, the Governing Board determines that the emission limit for exterior stains is not feasible by 2006; and

WHEREAS, in the event the Governing Board adopts Version 2 of Proposed Amended Rule 1113 – Architectural Coatings, the Governing Board determines the elimination of the small container exemption for clear wood finishes is not feasible by 2006 or by 2007; and

WHEREAS, the AQMD Governing Board directs staff to work with architectural coatings manufacturers and other interested parties to explore the feasibility of including in a coating manufacturer's averaging compliance program, limited volume products manufactured by a third party, such as clear wood finishes in quart containers or less; and

NOW, THEREFORE BE IT RESOLVED that the AQMD Governing Board does hereby approve the written responses to the comments to the Draft EA, and certify the Final EA for Proposed Amended Rule 1113 - Architectural Coatings, which was completed in compliance with CEQA and Rule 110 provisions; and find that the Final EA was presented to the AQMD Governing Board, whose members reviewed, considered, and approved the information therein prior to acting on Proposed Amended Rule 1113 - Architectural Coatings; and

BE IT FURTHER RESOLVED that the Board directs AQMD staff to work with industry and other stakeholders on assessing reactivity of architectural coatings. This analysis should include assessing the availability and reactivity of individual VOC species, under varying NOx conditions, as well as further development and refinement of the modeling assumptions for reactivity. The data gathered should be taken into consideration for a reactivity-based architectural coatings control strategy, if feasible.

BE IT FURTHER RESOLVED, that the AQMD Governing Board does hereby amend, pursuant to the authority granted by law, Rule 1113 - Architectural Coatings, as set forth in the attached, and incorporated herein by this reference.

Attachment

DATE:____________ ______________________________

CLERK OF THE BOARD

A T T A C H M E N T F

PROPOSED AMENDED RULE 1113 - ARCHITECTURAL COATINGS
VERSION 1

(Adopted Sept. 2, 1977)(Amended Dec. 2, 1977)(Amended Feb. 3, 1978)
(Amended Sept. 5, 1980)(Amended Apr. 3, 1981)(Amended July 3, 1981)
(Amended by California Air Resources Board Oct. 21, 1981)
(Amended Aug. 5, 1983)(Amended Mar. 16, 1984)(Amended Aug. 2, 1985)
(Amended Nov. 1, 1985)(Amended Feb. 6, 1987)(Amended Jan. 5, 1990)
(Amended Feb. 2, 1990)(Amended Nov. 2, 1990)(Amended Dec. 7, 1990)
(Amended Sept. 6, 1991)(Amended March 8, 1996)(Amended August 9, 1996)
(Amended November 8, 1996)(Amended May 14, 1999; Vacated)
(Amended July 20, 2001)(Amended December 6, 2002) (Amended December 5, 2003) VERSION 1

PROPOSED AMENDED RULE 1113. ARCHITECTURAL COATINGS

(a) Applicability

This rule is applicable to any person who supplies, sells, offers for sale, or manufactures any architectural coating for use in the District that is intended to be field applied to stationary structures or their appurtenances, and to mobile homes, pavements or curbs; as well as any person who applies or solicits the application of any architectural coating within the District. The purpose of this rule is to limit the VOC content of architectural coatings used in the District or to allow the averaging of such coatings, as specified, so their actual emissions do not exceed the allowable emissions if all the averaged coatings had complied with the specified limits.

(b) Definitions

For the purpose of this rule, the following definitions shall apply:

(1) AEROSOL COATING PRODUCT means a pressurized coating product containing pigments or resins that dispenses product ingredients by means of a propellant, and is packaged in a disposable can for hand-held application, or for use in specialized equipment for ground marking and traffic marking applications.

(2) ALUMINUM ROOF COATINGS are roof coatings containing at least 0.7 pounds per gallon (84 grams per liter) of coating as applied, of elemental aluminum pigment.

(3) APPURTENANCES are accessories to a stationary structure, including, but not limited to: hand railings, cabinets, bathroom and kitchen fixtures, fences, rain-gutters and down-spouts, window screens, lamp-posts, heating and air conditioning equipment, other mechanical equipment, large fixed stationary tools, signs, motion picture and television production sets, and concrete forms.

(4) ARCHITECTURAL COATINGS are any coatings applied to stationary structures and their appurtenances, to mobile homes, to pavements, or to curbs.

(5) BELOW-GROUND WOOD PRESERVATIVES are wood preservatives formulated to protect below-ground wood.

(6) BITUMINOUS COATING MATERIALS are black or brownish coating materials, soluble in carbon disulfide, consisting mainly of hydrocarbons and which are obtained from natural deposits, or as residues from the distillation of crude petroleum oils, or of low grades of coal.

(7) BITUMINOUS ROOF PRIMERS are primers formulated for or applied to roofing that incorporate bituminous coating materials.

(8) BOND BREAKERS are coatings formulated for or applied between layers of concrete to prevent the freshly poured top layer of concrete from bonding to the substrate over which it is poured.

(9) CLEAR BRUSHING LACQUERS are clear wood finishes, excluding clear lacquer sanding sealers, formulated with nitrocellulose or synthetic resins to dry by solvent evaporation without chemical reaction and to provide a solid, protective film, which are intended exclusively for application by brush, and which are labeled as specified in paragraph (d)(7).

(10) CLEAR WOOD FINISHES are clear and semi-transparent coatings, including lacquers and varnishes, applied to wood substrates to provide a transparent or translucent solid film.

(11) COATING is a material which is applied to a surface in order to beautify, protect, or provide a barrier to such surface.

(12) COLORANTS are solutions of dyes or suspensions of pigments.

(13) CONCRETE-CURING COMPOUNDS are coatings formulated for or applied to freshly poured concrete to retard the evaporation of water.

(14) DRY-FOG COATINGS are coatings which are formulated only for spray application so that when sprayed, overspray droplets dry before falling on floors and other surfaces.

(15) EXEMPT COMPOUNDS (See Rule 102-Definition of Terms.)

(16) FIRE-PROOFING EXTERIOR COATINGS are opaque coatings formulated to protect the structural integrity of outdoor steel and other outdoor construction materials and listed by Underwriter's Laboratories, Inc. for the fire protection of steel.

(17) FIRE-RETARDANT COATINGS are coatings labeled and formulated to retard ignition and flame spread, that has been fire tested and rated by a testing agency approved by building code officials for use in bringing building and construction materials into compliance with federal, state and local building code requirements. The fire-retardant coating and the testing agency must be approved by building code officials. The fire-retardant coating shall be tested in accordance with ASTM Test Method E 84-99, incorporated by reference in paragraph (e)(4) or listed by Underwriter's Laboratories, Inc. as fire-retardant coatings with a flame spread index of less than 25.

(18) FLAT COATINGS are coatings that register a gloss of less than 15 on an 85-degree meter or less than 5 on a 60-degree meter.

(19) FLOOR COATINGS are opaque coatings that are formulated for or applied to flooring; including but not limited to decks, porches, gymnasiums, and bowling alleys, but do not include Industrial Maintenance Coatings.

(20) FORMULATION DATA is the actual product recipe which itemizes all the ingredients contained in a product including VOCs and the quantities thereof used by the manufacturer to create the product.

(21) GRAMS OF VOC PER LITER OF COATING, LESS WATER AND LESS EXEMPT COMPOUNDS, is the weight of VOC per combined volume of VOC and coating solids and can be calculated by the following equation:

$$\text{Grams of VOC per Liter of Coating, Less Water and Less Exempt Compounds} = \frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

Where:

W_s = weight of volatile compounds in grams
W_w = weight of water in grams
W_{es} = weight of exempt compounds in grams
V_m = volume of material in liters
V_w = volume of water in liters
V_{es} = volume of exempt compounds in liters

For coatings that contain reactive diluents, the Grams of VOC per Liter of Coating, Less Water and Less Exempt Compounds, shall be calculated by the following equation:

$$\text{Grams of VOC per Liter of Coating, Less Water and Less Exempt Compounds} = \frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

Where: W_s = weight of volatile compounds emitted during curing, in grams
W_w = weight of water emitted during curing, in grams
W_{es} = weight of exempt compounds emitted during curing, in grams
V_m = volume of the material prior to reaction, in liters
V_w = volume of water emitted during curing, in liters
V_{es} = volume of exempt compounds emitted during curing, in liters

(22) GRAMS OF VOC PER LITER OF MATERIAL is the weight of VOC per volume of material and can be calculated by the following equation:

$$\text{Grams of VOC per Liter of Material} = \frac{W_s - W_w - W_{es}}{V_m}$$

Where: W_s = weight of volatile compounds in grams
W_w = weight of water in grams
W_{es} = weight of exempt compounds in grams
V_m = volume of the material in liters

(23) GRAPHIC ARTS COATINGS (Sign Paints) are coatings formulated for hand-application by artists using brush or roller techniques to indoor and outdoor signs (excluding structural components) and murals, including lettering enamels, poster colors, copy blockers, and bulletin enamels.

(24) HIGH-TEMPERATURE INDUSTRIAL MAINTENANCE COATINGS are industrial maintenance coatings formulated for or applied to substrates exposed continuously or intermittently to temperatures above 400 degrees Fahrenheit.

(25) INDUSTRIAL MAINTENANCE COATINGS are coatings, including primers, sealers, undercoaters, intermediate coatings and topcoats, formulated for or applied to substrates, including floors, that are exposed to one or more of the following extreme environmental conditions:

(A) immersion in water, wastewater, or chemical solutions (aqueous and non-aqueous solutions), or chronic exposure of interior surfaces to moisture condensation;

(B) acute or chronic exposure to corrosive, caustic or acidic agents, or similar chemicals, chemical fumes, chemical mixtures, or solutions;

(C) repeated exposure to temperatures in excess of 250 degrees Fahrenheit;

(D) repeated heavy abrasion, including mechanical wear and repeated scrubbing with industrial solvents, cleaners, or scouring agents; or

(E) exterior exposure of metal structures.

(26) INTERIOR STAINS are stains labeled and formulated exclusively for use on interior surfaces.

(27) JAPANS/FAUX FINISHING COATINGS are glazes designed for wet-in-wet techniques used as a stain or glaze to create artistic effects, including but not limited to, dirt, old age, smoke damage, and simulated marble and wood grain.

(28) LACQUERS are clear or pigmented wood finishes, including clear lacquer sanding sealers, formulated with nitrocellulose or synthetic resins to dry by evaporation without chemical reaction.

(29) LOW-SOLIDS COATINGS are coatings containing one pound or less of solids per gallon of material.

(30) MAGNESITE CEMENT COATINGS are coatings formulated for or applied to magnesite cement decking to protect the magnesite cement substrate from erosion by water.

(31) MASTIC COATINGS are coatings formulated to cover holes and minor cracks and to conceal surface irregularities, and applied in a thickness of at least 10 mils (dry, single coat).

(32) METALLIC PIGMENTED COATINGS are coatings, excluding roof coatings, containing at least 0.4 pounds per gallon (48 grams/liter) of coating, as applied, of elemental metallic pigment (excluding zinc), mica particles or any combination of metallic pigments and mica particles.

(33) MULTI-COLOR COATINGS are coatings which exhibit more than one color when applied and which are packaged in a single container and applied in a single coat.

(34) NONFLAT COATINGS are coatings that register a gloss of 5 or greater on a 60 degree meter and a gloss of 15 or greater on an 85 degree meter.

(35) POST-CONSUMER COATINGS are finished coatings that would have been disposed of in a landfill, having completed their usefulness to a consumer, and does not include manufacturing wastes.

(36) PRE-TREATMENT WASH PRIMERS are coatings which contain a minimum of 1/2 percent acid, by weight, applied directly to bare metal surfaces to provide necessary surface etching.

(37) PRIMERS are coatings applied to a surface to provide a firm bond between the substrate and subsequent coats.

(38) QUICK-DRY ENAMELS are non-flat coatings which comply with the following:

(A) Shall be capable of being applied directly from the container by brush or roller under normal conditions, normal conditions being ambient temperatures between 60°F and 80°F;

(B) When tested in accordance with ASTM D 1640 they shall: set-to-touch in two hours or less, dry-hard in eight hours or less, and be tack-free in four hours or less by the mechanical test method; and

(C) Shall have a 60° dried film gloss of no less than 70 upon application.

(39) QUICK-DRY PRIMERS, SEALERS, AND UNDERCOATERS are primers, sealers, and undercoaters which are intended to be applied to a surface to provide a firm bond between the substrate and subsequent coats and which are dry-to-touch in one-half hour and can be recoated in two hours (ASTM D 1640).

(40) REACTIVE DILUENT is a liquid which is a VOC during application and one in which, through chemical and/or physical reaction, such as polymerization, becomes an integral part of the coating.

(41) RECYCLED COATINGS are coatings formulated such that 50 percent or more of the total weight consists of secondary and post-consumer coatings and 10 percent or more of the total weight consists of post-consumer coatings, and manufactured by a certified recycled paint manufacturer.

(42) ROOF COATINGS are coatings formulated for application to exterior roofs for the primary purpose of preventing penetration of the substrate by water, or reflecting heat and ultraviolet radiation.

(43) RUST PREVENTATIVE COATINGS are coatings formulated for use in preventing the corrosion of metal surfaces in residential and commercial situations.

(44) SANDING SEALERS are clear wood coatings formulated for or applied to bare wood for sanding and to seal the wood for subsequent application of coatings. To be considered a sanding sealer a coating must be clearly labeled as such.

(45) SEALERS are coatings applied to either block materials from penetrating into or leaching out of a substrate, to prevent subsequent coatings from being absorbed by the substrate, or to prevent harm to subsequent coatings by materials in the substrate.

(46) SECONDARY (REWORK) COATINGS are fragments of finished coatings or finished coatings from a manufacturing process that has converted resources into a commodity of real economic value, but does not include excess virgin resources of the manufacturing process.

(47) SHELLACS are clear or pigmented coatings formulated solely with the resinous secretions of the lac beetle (laccifer lacca), thinned with alcohol, and formulated to dry by evaporation without a chemical reaction.

(8)SOLICIT is to require for use or to specify, by written or oral contract.

(9)SPECIALTY PRIMERS are coatings formulated for or applied to a substrate to seal fire, smoke or water damage; or to condition excessively chalky surfaces. An excessively chalky surface is one that is defined as having chalk rating of four or less as determined by ASTM D-4214 – Photographic Reference Standard No. 1 or the Federation of Societies for Coatings Technology “Pictorial Standards for Coatings Defects”.

(50) STAINS are opaque or semi-transparent coatings which are formulated to change the color but not conceal the grain pattern or texture.

(51) SWIMMING POOL COATINGS are coatings specifically formulated for or applied to the interior of swimming pools and to resist swimming pool chemicals.

(52) SWIMMING POOL REPAIR COATINGS are chlorinated, rubber-based coatings used for the repair and maintenance of swimming pools over existing chlorinated, rubber-based coatings.

(53) TINT BASE is an architectural coating to which colorants are added.

(54) TRAFFIC COATINGS are coatings formulated for or applied to public streets, highways, and other surfaces including, but not limited to, curbs, berms, driveways, and parking lots.

(55) UNDERCOATERS are coatings formulated for or applied to substrates to provide a smooth surface for subsequent coats.

(56) VARNISHES are clear wood finishes formulated with various resins to dry by chemical reaction on exposure to air.

(57) VOLATILE Organic COMPOUND (VOC) See Rule 102.

(58) WATERPROOFING SEALERS are coatings which are formulated for the primary purpose of preventing penetration of porous substrates by water.

(59) WATERPROOFING CONCRETE/MASONRY SEALERS are clear or pigmented sealers that are formulated for sealing concrete and masonry to provide resistance against water, alkalis, acids, ultraviolet light, and staining.

(60) WOOD PRESERVATIVES are coatings formulated to protect wood from decay or insect attack by the addition of a wood preservative chemical registered by the California Environmental Protection Agency.

(61) ZINC-RICH INDUSTRIAL MAINTENANCE PRIMERS are primers formulated to contain a minimum of 65 percent metallic zinc powder (zinc dust) by weight of total solids for application to metal substrates.

(c) Requirements

(1) Except as provided in paragraphs (c)(2), (c)(3), (c)(4), and specified coatings averaged under (c)(6), no person shall supply, sell, offer for sale, manufacture, blend, or repackage any architectural coating for use in the District which, at the time of sale or manufacture, contains more than 250 grams of VOC per liter of coating (2.08 pounds per gallon), less water, less exempt compounds, and less any colorant added to tint bases, and no person shall apply or solicit the application of any architectural coating within the District that exceeds 250 grams of VOC per liter of coating as calculated in this paragraph.

(2) Except as provided in paragraphs (c)(3), (c)(4), and designated coatings averaged under (c)(6), no person shall supply, sell, offer for sale, manufacture, blend, or repackage, for use within the District, any architectural coating listed in the Table of Standards which contains VOC

(excluding any colorant added to tint bases) in excess of the corresponding VOC limit specified in the table, after the effective date specified, and no person shall apply or solicit the application of any architectural coating within the District that exceeds the VOC limit as specified in this paragraph. No person shall apply or solicit the application within the District of any industrial maintenance coatings for residential use or for use in areas such as office space and meeting rooms of industrial, commercial or institutional facilities not exposed to such extreme environmental conditions described in the definition of industrial maintenance coatings; or of any rust-preventative coating for industrial use, unless such a rust preventative coating complies with the Industrial Maintenance Coating VOC limit specified in the Table of Standards.

TABLE OF STANDARDS
VOC LIMITS

Grams of VOC Per Liter of Coating,
Less Water and Less Exempt Compounds

COATING	Limit*	Effective Date								
		1/1/98	1/1/99	7/1/01	1/1/03	1/1/04	1/1/05	7/1/06	7/1/07	7/1/08
Bond Breakers	350									
Clear Wood Finishes										
Varnish	350							275		
Sanding Sealers	350							275		
Lacquer	680	550					275			
Clear Brushing Lacquer	680						275			
Concrete-Curing Compounds	350									
Dry-Fog Coatings	400									
Fire-Proofing Exterior Coatings	450		350							
Fire-Retardant Coatings										
Clear	650									
Pigmented	350									
Flats	250			100						50
Floor Coatings	420				100			50		
Graphic Arts (Sign) Coatings	500									
Industrial Maintenance (IM) Coatings	420					250		100		
High Temperature IM Coatings**					420					
Zinc-Rich IM Primers	420				340			100		
Japans/Faux Finishing Coatings	700		350							
Magnesite Cement Coatings	600		450							
Mastic Coatings	300									
Metallic Pigmented Coatings	500									
Multi-Color Coatings	420	250								
Non-Flat Coatings	250				150			50		
Pigmented Lacquer	680	550					275			
Pre-Treatment Wash Primers	780				420					
Primers, Sealers, and Undercoaters	350				200			100		
Quick-Dry Enamels	400				250			50		
Quick-Dry Primers, Sealers, and Undercoaters	350				200			100		
Recycled Coatings					250					
Roof Coatings	300				250		50			
Roof Coatings, Aluminum	500						100			

Roof Primers, Bituminous	350				350					
Rust Preventative Coatings	420				400			100		
Shellac										
Clear	730									
Pigmented	550									
Specialty Primers	350							100		
Stains	350				250				100	
Stains, Interior	250									
Swimming Pool Coatings										
Repair	650				340					
Other	340									
Traffic Coatings	250	150								
Waterproofing Sealers	400				250			100		
Waterproofing Concrete/Masonry Sealers	400							100		
Wood Preservatives										
Below-Ground	350									
Other	350									

* The specified limits remain in effect unless revised limits are listed in subsequent columns in the Table of Standards

** The National VOC Standard at 650 g/l is applicable until 1/1/2003

TABLE OF STANDARDS (cont.)
VOC LIMITS

Grams of VOC Per Liter of Material

COATING	Limit
Low-Solids Coating	120

(3) Coating Categorization

(A) If anywhere on the container of any coating listed in the Table of Standards, on any sticker or label affixed thereto, or in any sales or advertising literature, any representation is made that the coating may be used as, or is suitable for use as, a coating for which a lower VOC standard is specified in the table or in paragraph (c)(1), then the lowest VOC standard shall apply.

(B) The provisions of paragraph (c)(3)(A) shall not apply to a coating described in part as a flat, nonflat or primer-sealer-undercoater coating provided that all of the following requirements are met:

(i) The coating meets the definition of a specific coating category that allows a higher VOC standard, and

(ii) The coating is labeled in a manner consistent with the definition and the specific labeling requirement for that specific coating category, and

(iii) The coating is suitable and only recommended for the intended uses of that specific coating category.

(4) Any coating that is manufactured prior to the effective date of the applicable limit specified in the Table of Standards, and that has a VOC content above that limit (but not above the limit in effect on the date of manufacture), may be sold, supplied, offered for sale, or applied for up to three years after the specified effective date.

(5) All architectural coating containers used to apply the contents therein to a surface direct from said container by pouring, siphoning, brushing, rolling, padding, ragging or other means, shall be closed when not in use. These architectural coating containers include, but should not be limited to: drums, buckets, cans, pails, trays or other application containers.

(6) Averaging Compliance Option

In lieu of specific compliance with the applicable limits in the Table of Standards, manufacturers may average designated coatings such that their actual cumulative emissions from the averaged coatings are less than or equal to the cumulative emissions that would have been allowed under those limits over a compliance period not to exceed one year.

(A) On or after January 1, 2001, the following coatings may be averaged: floor coatings; primers, sealers, and undercoaters; quick-dry primers, sealers, and undercoaters; quick-dry enamels; rust preventative coatings; roof coatings; specialty primers; stains; waterproofing sealers; industrial maintenance coatings; as well as flats and non-flats (excluding recycled coatings).

(B) On or after July 1, 2006, the following coatings in addition to those designated in subparagraph (c)(6)(A) may be averaged: bituminous roof primers; interior stains; waterproofing concrete/masonry sealers; varnishes; and sanding sealers.

(C) Manufacturers using the Averaging Compliance Option shall:

(i) Comply with the averaging provisions contained in Appendix A, as well as maintain records and make these records available for inspection, for at least three years after the end of the compliance period, and

(ii) Use only the sell through provision in Appendix A for each coating included in the Program in lieu of the sell through provision of subparagraph (c)(4).

(d) Administrative Requirements

(1) Containers for all coatings subject to this rule shall display the date of manufacture of the contents or a code indicating the date of manufacture. The manufacturers of such coatings shall file with the Executive Officer of the District and the Executive Officer of the Air Resources Board an explanation of each code.

(2) Containers for all coatings subject to the requirements of this rule shall carry a statement of the manufacturer's recommendation regarding thinning of the coating. This requirement shall not apply to the thinning of architectural coatings with water. The recommendation shall specify that the coating is to be employed without thinning or diluting under normal environmental and application conditions, unless any thinning recommended on the label for normal environmental and application conditions does not cause a coating to exceed its applicable standard.

(3) Each container of any coating subject to this rule shall display the maximum VOC content of the coating, as supplied, and after any thinning as recommended by the manufacturer. The VOC content of low-solids coatings shall be displayed as grams of VOC per liter of material (excluding any colorant added to the tint bases) and the VOC content of any other coating shall be displayed as grams of VOC per liter of coating (less water and less exempt compounds, and excluding any colorant added to tint bases). VOC content displayed may be calculated using product formulation data, or may be determined using the test method in subdivision (e).

(4) The coating container label or container for quick-dry primers, sealers, and undercoaters and quick-dry enamels shall include the words "Quick-Dry" or shall list the following:

(A) The recoat time for quick-dry primers, sealers, and undercoaters, or

(B) The dry-hard time for quick-dry enamels.

Containers and container labels shall not contain the words "Quick-Dry" unless the material meets the dry times specified in the respective definitions or the material complies with the respective general VOC limit for enamels or primers, sealers, and undercoaters.

(5) The labels of all rust preventative coatings shall include the statement "For Metal Substrates Only" prominently displayed, effective January 1, 2003.

(6) Effective January 1, 2003, the labels of all specialty primers shall prominently display one or more of the following descriptions:

(A) For fire-damaged substrates.

(B) For smoke-damaged substrates.

(C) For water-damaged substrates.

(D) For excessively chalky substrates.

(7) The labels of all clear brushing lacquers shall include the statements "For brush applications only" and "This product must not be thinned or sprayed", prominently displayed, effective January 1, 2002 until January 1, 2005.

(8) Each manufacturer of the following coating categories shall, on or before April 1 of each calendar year submit an annual report to the Executive Officer:

(A) Clear brushing lacquers until April 1, 2006.

(B) Recycled coatings, including the gallons repackaged and distributed in the District.

(C) Rust preventative coatings.

(D) Specialty primers.

The report shall specify the number of gallons of each coating within the category sold in the District during the preceding calendar year as well as their coating VOC content, and shall describe the method used by the manufacturer to calculate such sales.

(9) A manufacturer, distributor, or seller of a coating meeting the requirements of this rule, who supplies that coating to a person who applies it in a non-compliant manner, shall not be liable for that non-compliant use, unless the manufacturer, distributor, or seller knows that the supplied coating would be used in a non-compliant manner.

(10) Manufacturers of recycled coatings shall submit a letter to the Executive Officer certifying their status as a Recycled Paint Manufacturer.

(e) Test Methods

For the purpose of this rule, the following test methods shall be used:

(1) VOC Content of Coatings

The VOC content of coatings subject to the provisions of this rule shall be determined by:

(A) The United States Environmental Protection Agency (USEPA) Reference Test Method 24 (Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings, Code of Federal Regulations Title 40, Part 60, Appendix A) with the exempt compounds' content determined by Method 303 (Determination of Exempt Compounds) in the South Coast Air Quality Management District's (SCAQMD) "Laboratory Methods of Analysis for Enforcement Samples" manual, or

(B) Method 304 [Determination of Volatile Organic Compounds (VOC) in Various Materials] in the SCAQMD's "Laboratory Methods of Analysis for Enforcement Samples" manual.

(C) Exempt Perfluorocarbons

The following classes of compounds:

cyclic, branched, or linear, completely fluorinated alkanes

cyclic, branched, or linear, completely fluorinated ethers with no unsaturations

cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations

sulfur-containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine

will be analyzed as exempt compounds for compliance with subdivision (c), only when manufacturers specify which individual compounds are used in the coating formulations. In addition, the manufacturers must identify the USEPA, ARB, and SCAQMD approved test methods, which can be used to quantify the amount of each exempt compound.

(2) Acid Content of Coatings

The acid content of a coating subject to the provisions of this rule shall be determined by ASTM Test Method D 1613-85 (Acidity in Volatile Solvents and Chemical Intermediates Used in Paint, Varnish, Lacquer, and Related Products).

(3) Metal Content of Coatings

The metallic content of a coating subject to the provisions of this rule shall be determined by Method 311 (Determination of Percent Metal in Metallic

Coatings by Spectrographic Method) in the SCAQMD's "Laboratory Methods of Analysis for Enforcement Samples" manual.

(4) Flame Spread Index

The flame spread index of a fire-retardant coating subject to the provisions of this rule shall be determined by ASTM Test Method E 84-99 (Standard Test Method for Surface Burning Characteristics of Building Materials) after application to an organic or inorganic substrate, based on the manufacturer's recommendations.

(5) Drying Times

The set-to-touch, dry-hard, dry-to-touch, and dry-to-recoat times of a coating subject to the provisions of this rule shall be determined by ASTM Test Method D 1640 (Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature). The tack-free time of a coating subject to the provisions of this rule shall be determined by ASTM Test Method D 1640, according to the Mechanical Test Method.

(6) Gloss Determination

The gloss shall be determined by ASTM Test Method D 523 (Specular Gloss).

(7) Equivalent Test Methods

Other test methods determined to be equivalent after review by the staffs of the District, the California Air Resources Board, and the USEPA, and approved in writing by the District Executive Officer may also be used.

(8) Multiple Test Methods

When more than one test method or set of test methods are specified for any testing, a violation of any requirement of this rule established by any one of the specified test methods or set of test methods shall constitute a violation of the rule.

(9) All test methods referenced in this subdivision shall be the version most recently approved by the appropriate governmental entities.

(f) Technology Assessment

The Executive Officer shall conduct a technology assessment for the future VOC limit for the following coatings as specified in paragraph (c)(2).

(1) Flat coatings by July 1, 2007.

(2) Lacquers by January 1, 2004.

(3) Nonflats; primers, sealers, and undercoaters; quick-dry primers, sealers, and undercoaters; quick-dry enamels; waterproofing sealers; stains; floor; rust preventative; varnishes; and industrial maintenance coatings by July 1, 2005.

In conducting the above technology assessments, the Executive Officer shall consider any applicable future California Air Resources Board surveys on architectural coatings.

After each technology assessment, the Executive Officer shall report to the Governing Board as to the appropriateness of maintaining the future VOC limit.

The Executive Officer shall conduct a study to further assess reactivity of architectural coatings.

(g) Exemptions

(1) The provisions of this rule shall not apply to:

(A) Architectural coatings in containers having capacities of one quart or less, provided that the manufacturer submits an annual report to the Executive Officer within three months of the end of each calendar year. The report shall contain information as required by the Executive Officer to monitor the use of the small container exemption. The loss of this exemption due to the failure of the manufacturer to submit an annual report shall apply only to the manufacturer. Effective July 1, 2006 clear wood finishes, including varnishes and sanding sealers; and lacquers, including pigmented lacquers, in containers having capacities of one quart or less shall no longer be exempt from the requirements of this rule.

(B) Architectural coatings sold in this District for shipment outside of this District or for shipment to other manufacturers for repackaging; or

(C) Emulsion type bituminous pavement sealers; or

(D) Aerosol coating products.

(E) Use of stains and lacquers in all areas within the District at an elevation of 4,000 feet or greater above sea level.

(2) Notwithstanding the provisions of paragraph (c)(2), a person or facility may add up to 10 percent by volume of VOC to a lacquer to avoid blushing of the finish during days with relative humidity greater than 70

percent and temperature below 65 degrees Fahrenheit, at the time of application provided that:

(A) The coating is not applied from April 1 to October 31 of any year.

(B) The coating contains acetone and no more than 550 grams of VOC per liter of coating (275 grams of VOC per liter of coating after January 1, 2005), less water and exempt compounds, prior to the addition of VOC.

(3) The January 1, 2005 VOC limit for lacquers shall not be applicable until January 1, 2007 and the July 1, 2008 VOC limit for flat coatings shall not be applicable to any manufacturer which meets all of the following criteria:

(A) The total gross annual receipts are $2,000,000 or less, and

(B) The total number of employees is 100 or less, and

(C) The manufacturer requesting this exemption files a written request with the Executive Officer annually which includes, but is not limited to:

(i) The total gross annual receipts for each of the last three years.

(ii) The total number of employees for each of the last three years.

For the purposes of determining the total gross annual receipts and the total number of employees, a manufacturer shall include data from all facilities (both within and outside of the District) which they own, operate, have an ownership interest, or are legally affiliated. If a manufacturer exceeds the criteria specified in subparagraphs (g)(3)(A) or (g)(3)(B) any time after the initial request is filed with the Executive Officer, this exemption shall be immediately terminated, the manufacturer shall forfeit any future eligibility for this exemption, and the manufacturer shall be considered in violation of this rule for each and every day that lacquers or flat coatings which do not comply with the respective VOC limit in the Table of Standards are supplied, sold, or offered for sale within the District. The loss of this exemption due to the manufacturer exceeding the criteria in subparagraphs (g)(3)(A) or (g)(3)(B) shall apply only to the manufacturer.

(4) The provisions of paragraph (c) shall not apply to facilities which apply coatings to test specimens for purposes of research and development of those coatings.

(5) The July 1, 2006 VOC limit for nonflats, primers, sealers, and undercoaters, quick-dry enamels, waterproofing concrete/masonry sealers and rust-preventative coatings shall not be applicable until July 1, 2008 to any manufacturer which meets all of the following criteria:

(A) The total gross annual receipts are $5,000,000 or less, and

(B) The total number of employees is 100 or less, and

(C) The manufacturer requesting this exemption files a written request with the Executive Officer annually which includes, but is not limited to:

(i) The total gross annual receipts for each of the last three years.

(ii) The total number of employees for each of the last three years.

For the purposes of determining the total gross annual receipts and the total number of employees, a manufacturer shall include data from all facilities (both within and outside of the District) which they own, operate, have an ownership interest, or are legally affiliated. If a manufacturer exceeds the criteria specified in subparagraphs (g)(5)(A) or (g)(5)(B) any time after the initial request is filed with the Executive Officer, this exemption shall be immediately terminated, the manufacturer shall forfeit any future eligibility for this exemption, and the manufacturer shall be considered in violation of this rule for each and every day that nonflats, primers, sealers, and undercoaters, quick-dry enamels, and rust-preventative coatings do not comply with the respective VOC limit in the Table of Standards are supplied, sold, or offered for sale within the District. The loss of this exemption due to the manufacturer exceeding the criteria in subparagraphs (g)(5)(A) or (g)(5)(B) shall apply only to the manufacturer.

(6) Effective January 1, 2005 through December 31, 2006, roof coatings with a VOC content of 100 grams per liter or less that are certified under the USEPA Energy Star Program shall not be subject to the VOC limit in the Table of Standards.

APPENDIX A: Averaging Provision

(A) The manufacturer shall demonstrate that actual emissions from the coatings being averaged are less than or equal to the allowable emissions, for the specified compliance period using the following equation:

$$\sum_{i=1}^{n} GiMi \leq \sum_{i=1}^{n} GiViLi$$

Where:

$\sum_{i=1}^{n} GiMi$ = Actual Emissions

$\sum_{i=1}^{n} GiViLi$ = Allowable Emissions

Gi = Total Gallons of Product (i) subject to Averaging;

Mi = Material VOC content of Product (i), as pounds per gallon; {as defined in paragraph (b)(21)}

Vi = Percent by Volume Solids and VOC in Product (i), {as defined in paragraph (b)(20)}

$$= \frac{Vm - Vw - Ves}{Vm}$$

For Non-Zero VOC Coatings:

$$= \frac{\text{Material VOC}}{\text{Coating VOC}}$$

For Zero VOC coatings:

= % solids by volume

Li = Regulatory VOC Content Limit for Product (i), as pounds per gallon; {as listed in paragraph (c)(2) Table of Standards}

The averaging is limited to coatings that are designated by the manufacturer. Any coating not designated in the averaging Program shall comply with the VOC limit in the Table of Standards. The manufacturer shall not include any quantity of coatings that it knows or should have known will not be used in the District.

In addition to the requirements specified in Section (A), a manufacturer shall not include in an Averaging Program any coating with a VOC content in excess of the maximum VOC content in effect, immediately prior to July 1, 2001 or the VOC content limits specified in the National VOC Emission Standard, whichever is less. Manufacturers that submitted an annual exemption report in 2002 for quick-dry primers, sealers and undercoaters and included those coatings in their most recent approved Averaging Compliance Option Program, may continue to average those coatings until July 1, 2006, so long as these coatings do not exceed 450 grams of VOC per liter of coating less water and less exempt compounds, in lieu of the otherwise applicable VOC limit of 350 grams per liter.

(B) Averaging Program (Program)

At least six months prior to the start of the compliance period, manufacturers shall submit an Averaging Program, which is subject to all the provisions of Rule 221 – Plans and Rule 306 – Plan Fees, to the Executive Officer. Averaging may not be implemented until the Program is approved in writing by the Executive Officer.

Within 45 days of submittal of a Program, the Executive Officer shall either approve, disapprove or deem the Program incomplete. The Program applicant and the Executive Officer may agree to an extension of time for the Executive Officer to take action on the Program.

(C) General Requirements

The Program shall include all necessary information for the Executive Officer to make a determination as to whether the manufacturer may comply with the averaging requirements over the specified compliance period in an enforceable manner. Such information shall include, but is not limited to, the following:

1. An identification of the contact persons, telephone numbers, and name of the manufacturer who is submitting the Program.
2. An identification of each coating that has been selected by the manufacturer for inclusion in this program that exceeds the applicable VOC limit in the Table of Standards, their VOC content specified in units of both grams of VOC per liter of coating, and grams of VOC per liter of material and the designation of the coating category.
3. A detailed demonstration showing that the projected actual emissions will not exceed the allowable emissions for a single compliance period that the Program will be in effect. In addition, the demonstration shall include

VOC content information for each coating that are below the compliance limit in the Table of Standards. The demonstration shall use the equation specified in paragraph (A) of this Appendix for projecting the actual emissions and allowable emissions during each compliance period. The demonstration shall also include all VOC content levels and projected volume within the District for each coating listed in the Program during each compliance period. The requested data can be summarized in a matrix form.

4. A specification of the compliance period(s) and applicable reporting dates. The length of the compliance period shall not be more than one year nor less than six months.
5. An identification and description of all records to be made available to the Executive Officer upon request, if different than those identified under paragraph (c)(6). Records to track volume and to demonstrate compliance shall be included. Such records may include, but are not limited to, distribution records (shipping manifests, bills of lading, etc.), point of sale receipts, invoices to local distributors, composition reports, production batch tickets, computer summaries of the data with paper records available for detailed information, and records of VOC calculations. If the type of records submitted are not specifically listed above, those records must be approved by the USEPA, ARB, and the Executive Officer before an Averaging Program can be approved.
6. An identification and description of specific records to be used in calculating emissions for the Program and subsequent reporting, and a detailed explanation as to how those records will be used by the manufacturer to verify compliance with the averaging requirements.
7. A statement, signed by a responsible party for the manufacturer, that all information submitted is true and correct, and that records will be made available to the Executive Officer upon request.

(D) Reporting Requirements

1. For every single compliance period, the manufacturer shall submit a mid-term report listing all coatings subject to averaging during the first half of the compliance period, detailed analysis of the actual and allowable emissions at the end of the mid-term, and if actual emissions exceed allowable emissions an explanation as to how the manufacturer intends to achieve compliance by the end of the compliance period. The report shall

be signed by the responsible party for the manufacturer, attesting that all information submitted is true and correct. The mid-term report shall be submitted within 45 days after the midway date of the compliance period. A manufacturer may request, in writing, an extension of up to 15 days for submittal of the mid-term report.

2. Within 60 days after the end of the compliance period or upon termination of the Program, whichever is sooner, the manufacturer shall submit to the Executive Officer a final report, providing a detailed demonstration of the balance between the actual and allowable emissions for the compliance period, an update of any identification and description of specific records used by the manufacturer to verify compliance with the averaging requirement, and any other information requested by the Executive Officer to determine whether the manufacturer complied with the averaging requirements over the specified compliance period. The report shall be signed by the responsible party for the manufacturer, attesting that all information submitted is true and correct, and that records will be made available to the Executive Officer upon request. A manufacturer may request, in writing, an extension of up to 30 days for submittal of the final report.

(E) Renewal of a Program

A Program automatically expires at the end of the compliance period. The manufacturer may request a renewal of the Program by submitting a renewal request that shall include an updated Program, meeting all applicable Program requirements. The renewal request will be considered conditionally approved until the Executive Officer makes a final decision to deny or approve the renewal request based on a determination of whether the manufacturer is likely to comply with the averaging requirements. The Executive Officer shall base such determination on all available information, including but not limited to, the mid-term and final reports of the preceding compliance period. The Executive Officer shall make a decision to deny or approve a renewal request no later than 45 days from the date of the final report submittal, unless the manufacturer and the Executive Officer agree to an extension of time for the Executive Officer to take action on the renewal request.

(F) Modification of a Program

A manufacturer may request a modification of the Program at any time prior to the end of the compliance period. The Executive Officer shall take action to approve or disapprove the modification request no longer than 45 days from the date of its submittal. No modification of the compliance period shall be allowed. A Program need not be modified to specify additional coatings to be averaged that are below the applicable VOC limits.

(G) Termination of a Program

1. A manufacturer may terminate its Program at any time by filing a written notification to the Executive Officer. The filing date shall be considered the effective date of the termination, and all other provisions of this rule including the VOC limits shall immediately thereafter apply. The manufacturer shall also submit a final report 60 days after the termination date. Any exceedance of the actual emissions over the allowable emissions over the period that the Program was in effect shall constitute a separate violation for each day of the entire compliance period.
2. The Executive Officer may terminate a Program if any of the following circumstances occur:
   (a) The manufacturer violates the requirements of the approved Program, and at the end of the compliance period, the actual emissions exceed the allowable emissions.
   (b) The manufacturer demonstrates a recurring pattern of violations and has consistently failed to take the necessary steps to correct those violations.

(H) Change in VOC Limits

If the VOC limits of a coating listed in the Program are amended such that its effective date is less than one year from the date of adoption, the affected manufacturer may base its averaging on the prior limits of that coating until the end of the compliance period immediately following the date of adoption.

(I) Labeling

Each container of any coating that is included in averaging program, and that exceeds the applicable VOC limit in the Table of Standards shall display the following statement: "This product is subject to the averaging provisions of

SCAQMD Rule 1113". A symbol specified by the Executive Officer may be used as a substitute.

(J) Violations

The exceedance of the allowable emissions for any compliance period shall constitute a separate violation for each day of the compliance period. However, any violation of the requirements of the Averaging Provision of this rule, which the violator can demonstrate, to the Executive Officer, did not cause or allow the emission of an air contaminant and was not the result of negligent or knowing activity may be considered a minor violation (pursuant to District Rule 112).

(K) Sell Through Provision

A coating that is included in an approved Averaging Program that does not comply with the specified limit in the Table of Standards may be sold, supplied, offered for sale, or applied for up to three years after the end of the compliance period specified in the approved Averaging Program. This section of Appendix A does not apply to any coating that does not display on the container either the statement: "This product is subject to architectural coatings averaging provisions of the SCAQMD Rule 1113" or a designated symbol specified by the Executive Officer of the SCAQMD.

ATTACHMENT F

PROPOSED AMENDED RULE 1113 - ARCHITECTURAL COATINGS
VERSION 2

(Adopted Sept. 2, 1977)(Amended Dec. 2, 1977)(Amended Feb. 3, 1978)
(Amended Sept. 5, 1980)(Amended Apr. 3, 1981)(Amended July 3, 1981)
(Amended by California Air Resources Board Oct. 21, 1981)
(Amended Aug. 5, 1983)(Amended Mar. 16, 1984)(Amended Aug. 2, 1985)
(Amended Nov. 1, 1985)(Amended Feb. 6, 1987)(Amended Jan. 5, 1990)
(Amended Feb. 2, 1990)(Amended Nov. 2, 1990)(Amended Dec. 7, 1990)
(Amended Sept. 6, 1991)(Amended March 8, 1996)(Amended August 9, 1996)
(Amended November 8, 1996)(Amended May 14, 1999; Vacated)
(Amended July 20, 2001)(Amended December 6, 2002) (Amended December 5, 2003) VERSION 2

PROPOSED AMENDED RULE 1113. ARCHITECTURAL COATINGS

(a) Applicability

This rule is applicable to any person who supplies, sells, offers for sale, or manufactures any architectural coating for use in the District that is intended to be field applied to stationary structures or their appurtenances, and to mobile homes, pavements or curbs; as well as any person who applies or solicits the application of any architectural coating within the District. The purpose of this rule is to limit the VOC content of architectural coatings used in the District or to allow the averaging of such coatings, as specified, so their actual emissions do not exceed the allowable emissions if all the averaged coatings had complied with the specified limits.

(b) Definitions

For the purpose of this rule, the following definitions shall apply:

(1) AEROSOL COATING PRODUCT means a pressurized coating product containing pigments or resins that dispenses product ingredients by means of a propellant, and is packaged in a disposable can for hand-held application, or for use in specialized equipment for ground marking and traffic marking applications.

(2) ALUMINUM ROOF COATINGS are roof coatings containing at least 0.7 pounds per gallon (84 grams per liter) of coating as applied, of elemental aluminum pigment.

(3) APPURTENANCES are accessories to a stationary structure, including, but not limited to: hand railings, cabinets, bathroom and kitchen fixtures, fences, rain-gutters and down-spouts, window screens, lamp-posts, heating and air conditioning equipment, other mechanical equipment, large fixed stationary tools, signs, motion picture and television production sets, and concrete forms.

(4) ARCHITECTURAL COATINGS are any coatings applied to stationary structures and their appurtenances, to mobile homes, to pavements, or to curbs.

(5) BELOW-GROUND WOOD PRESERVATIVES are wood preservatives formulated to protect below-ground wood.

(6) BITUMINOUS COATING MATERIALS are black or brownish coating materials, soluble in carbon disulfide, consisting mainly of hydrocarbons and which are obtained from natural deposits, or as residues from the distillation of crude petroleum oils, or of low grades of coal.

(7) BITUMINOUS ROOF PRIMERS are primers formulated for or applied to roofing that incorporate bituminous coating materials.

(8) BOND BREAKERS are coatings formulated for or applied between layers of concrete to prevent the freshly poured top layer of concrete from bonding to the substrate over which it is poured.

(9) CLEAR BRUSHING LACQUERS are clear wood finishes, excluding clear lacquer sanding sealers, formulated with nitrocellulose or synthetic resins to dry by solvent evaporation without chemical reaction and to provide a solid, protective film, which are intended exclusively for application by brush, and which are labeled as specified in paragraph (d)(7).

(10) CLEAR WOOD FINISHES are clear and semi-transparent coatings, including lacquers and varnishes, applied to wood substrates to provide a transparent or translucent solid film.

(11) COATING is a material which is applied to a surface in order to beautify, protect, or provide a barrier to such surface.

(12) COLORANTS are solutions of dyes or suspensions of pigments.

(13) CONCRETE-CURING COMPOUNDS are coatings formulated for or applied to freshly poured concrete to retard the evaporation of water.

(14) DRY-FOG COATINGS are coatings which are formulated only for spray application so that when sprayed, overspray droplets dry before falling on floors and other surfaces.

(15) EXEMPT COMPOUNDS (See Rule 102-Definition of Terms.)

(16) FIRE-PROOFING EXTERIOR COATINGS are opaque coatings formulated to protect the structural integrity of outdoor steel and other outdoor construction materials and listed by Underwriter's Laboratories, Inc. for the fire protection of steel.

(17) FIRE-RETARDANT COATINGS are coatings labeled and formulated to retard ignition and flame spread, that has been fire tested and rated by a testing agency approved by building code officials for use in bringing building and construction materials into compliance with federal, state and local building code requirements. The fire-retardant coating and the testing agency must be approved by building code officials. The fire-retardant coating shall be tested in accordance with ASTM Test Method E 84-99, incorporated by reference in paragraph (e)(4) or listed by Underwriter's Laboratories, Inc. as fire-retardant coatings with a flame spread index of less than 25.

(18) FLAT COATINGS are coatings that register a gloss of less than 15 on an 85-degree meter or less than 5 on a 60-degree meter.

(19) FLOOR COATINGS are opaque coatings that are formulated for or applied to flooring; including but not limited to decks, porches, gymnasiums, and bowling alleys, but do not include Industrial Maintenance Coatings.

(20) FORMULATION DATA is the actual product recipe which itemizes all the ingredients contained in a product including VOCs and the quantities thereof used by the manufacturer to create the product.

(21) GRAMS OF VOC PER LITER OF COATING, LESS WATER AND LESS EXEMPT COMPOUNDS, is the weight of VOC per combined volume of VOC and coating solids and can be calculated by the following equation:

$$\text{Grams of VOC per Liter of Coating, Less Water and Less Exempt Compounds} = \frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

Where:

W_s = weight of volatile compounds in grams
W_w = weight of water in grams
W_{es} = weight of exempt compounds in grams
V_m = volume of material in liters
V_w = volume of water in liters
V_{es} = volume of exempt compounds in liters

For coatings that contain reactive diluents, the Grams of VOC per Liter of Coating, Less Water and Less Exempt Compounds, shall be calculated by the following equation:

$$\text{Grams of VOC per Liter of Coating, Less Water and Less Exempt Compounds} = \frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

Where:
- W_s = weight of volatile compounds emitted during curing, in grams
- W_w = weight of water emitted during curing, in grams
- W_{es} = weight of exempt compounds emitted during curing, in grams
- V_m = volume of the material prior to reaction, in liters
- V_w = volume of water emitted during curing, in liters
- V_{es} = volume of exempt compounds emitted during curing, in liters

(22) GRAMS OF VOC PER LITER OF MATERIAL is the weight of VOC per volume of material and can be calculated by the following equation:

$$\text{Grams of VOC per Liter of Material} = \frac{W_s - W_w - W_{es}}{V_m}$$

Where:
- W_s = weight of volatile compounds in grams
- W_w = weight of water in grams
- W_{es} = weight of exempt compounds in grams
- V_m = volume of the material in liters

(23) GRAPHIC ARTS COATINGS (Sign Paints) are coatings formulated for hand-application by artists using brush or roller techniques to indoor and outdoor signs (excluding structural components) and murals, including lettering enamels, poster colors, copy blockers, and bulletin enamels.

(24) HIGH-TEMPERATURE INDUSTRIAL MAINTENANCE COATINGS are industrial maintenance coatings formulated for or applied to substrates exposed continuously or intermittently to temperatures above 400 degrees Fahrenheit.

(25) INDUSTRIAL MAINTENANCE COATINGS are coatings, including primers, sealers, undercoaters, intermediate coatings and topcoats, formulated for or applied to substrates, including floors, that are exposed to one or more of the following extreme environmental conditions:

(A) immersion in water, wastewater, or chemical solutions (aqueous and non-aqueous solutions), or chronic exposure of interior surfaces to moisture condensation;

(B) acute or chronic exposure to corrosive, caustic or acidic agents, or similar chemicals, chemical fumes, chemical mixtures, or solutions;

(C) repeated exposure to temperatures in excess of 250 degrees Fahrenheit;

(D) repeated heavy abrasion, including mechanical wear and repeated scrubbing with industrial solvents, cleaners, or scouring agents; or

(E) exterior exposure of metal structures.

(26) INTERIOR STAINS are stains labeled and formulated exclusively for use on interior surfaces.

(27) JAPANS/FAUX FINISHING COATINGS are glazes designed for wet-in-wet techniques used as a stain or glaze to create artistic effects, including but not limited to, dirt, old age, smoke damage, and simulated marble and wood grain.

(28) LACQUERS are clear or pigmented wood finishes, including clear lacquer sanding sealers, formulated with nitrocellulose or synthetic resins to dry by evaporation without chemical reaction.

(29) LOW-SOLIDS COATINGS are coatings containing one pound or less of solids per gallon of material.

(30) MAGNESITE CEMENT COATINGS are coatings formulated for or applied to magnesite cement decking to protect the magnesite cement substrate from erosion by water.

(31) MASTIC COATINGS are coatings formulated to cover holes and minor cracks and to conceal surface irregularities, and applied in a thickness of at least 10 mils (dry, single coat).

(32) METALLIC PIGMENTED COATINGS are coatings, excluding roof coatings, containing at least 0.4 pounds per gallon (48 grams/liter) of coating, as applied, of elemental metallic pigment (excluding zinc), mica particles or any combination of metallic pigments and mica particles.

(33) MULTI-COLOR COATINGS are coatings which exhibit more than one color when applied and which are packaged in a single container and applied in a single coat.

(34) NONFLAT COATINGS are coatings that register a gloss of 5 or greater on a 60 degree meter and a gloss of 15 or greater on an 85 degree meter.

(35) POST-CONSUMER COATINGS are finished coatings that would have been disposed of in a landfill, having completed their usefulness to a consumer, and does not include manufacturing wastes.

(36) PRE-TREATMENT WASH PRIMERS are coatings which contain a minimum of 1/2 percent acid, by weight, applied directly to bare metal surfaces to provide necessary surface etching.

(37) PRIMERS are coatings applied to a surface to provide a firm bond between the substrate and subsequent coats.

(38) QUICK-DRY ENAMELS are non-flat coatings which comply with the following:

(A) Shall be capable of being applied directly from the container by brush or roller under normal conditions, normal conditions being ambient temperatures between 60°F and 80°F;

(B) When tested in accordance with ASTM D 1640 they shall: set-to-touch in two hours or less, dry-hard in eight hours or less, and be tack-free in four hours or less by the mechanical test method; and

(C) Shall have a 60° dried film gloss of no less than 70 upon application.

(39) QUICK-DRY PRIMERS, SEALERS, AND UNDERCOATERS are primers, sealers, and undercoaters which are intended to be applied to a surface to provide a firm bond between the substrate and subsequent coats and which are dry-to-touch in one-half hour and can be recoated in two hours (ASTM D 1640).

(40) REACTIVE DILUENT is a liquid which is a VOC during application and one in which, through chemical and/or physical reaction, such as polymerization, becomes an integral part of the coating.

(41) RECYCLED COATINGS are coatings formulated such that 50 percent or more of the total weight consists of secondary and post-consumer coatings and 10 percent or more of the total weight consists of post-consumer coatings, and manufactured by a certified recycled paint manufacturer.

(42) ROOF COATINGS are coatings formulated for application to exterior roofs for the primary purpose of preventing penetration of the substrate by water, or reflecting heat and ultraviolet radiation.

(43) RUST PREVENTATIVE COATINGS are coatings formulated for use in preventing the corrosion of metal surfaces in residential and commercial situations.

(44) SANDING SEALERS are clear wood coatings formulated for or applied to bare wood for sanding and to seal the wood for subsequent application of coatings. To be considered a sanding sealer a coating must be clearly labeled as such.

(45) SEALERS are coatings applied to either block materials from penetrating into or leaching out of a substrate, to prevent subsequent coatings from being absorbed by the substrate, or to prevent harm to subsequent coatings by materials in the substrate.

(46) SECONDARY (REWORK) COATINGS are fragments of finished coatings or finished coatings from a manufacturing process that has converted resources into a commodity of real economic value, but does not include excess virgin resources of the manufacturing process.

(47) SHELLACS are clear or pigmented coatings formulated solely with the resinous secretions of the lac beetle (laccifer lacca), thinned with alcohol, and formulated to dry by evaporation without a chemical reaction.

(8)SOLICIT is to require for use or to specify, by written or oral contract.

(9)SPECIALTY PRIMERS are coatings formulated for or applied to a substrate to seal fire, smoke or water damage; or to condition excessively chalky surfaces. An excessively chalky surface is one that is defined as having chalk rating of four or less as determined by ASTM D-4214 – Photographic Reference Standard No. 1 or the Federation of Societies for Coatings Technology "Pictorial Standards for Coatings Defects".

(50) STAINS are opaque or semi-transparent coatings which are formulated to change the color but not conceal the grain pattern or texture.

(51) SWIMMING POOL COATINGS are coatings specifically formulated for or applied to the interior of swimming pools and to resist swimming pool chemicals.

(52) SWIMMING POOL REPAIR COATINGS are chlorinated, rubber-based coatings used for the repair and maintenance of swimming pools over existing chlorinated, rubber-based coatings.

(53) TINT BASE is an architectural coating to which colorants are added.

(54) TRAFFIC COATINGS are coatings formulated for or applied to public streets, highways, and other surfaces including, but not limited to, curbs, berms, driveways, and parking lots.

(55) UNDERCOATERS are coatings formulated for or applied to substrates to provide a smooth surface for subsequent coats.

(56) VARNISHES are clear wood finishes formulated with various resins to dry by chemical reaction on exposure to air.

(57) VOLATILE Organic COMPOUND (VOC) See Rule 102.

(58) WATERPROOFING SEALERS are coatings which are formulated for the primary purpose of preventing penetration of porous substrates by water.

(59) WATERPROOFING CONCRETE/MASONRY SEALERS are clear or pigmented sealers that are formulated for sealing concrete and masonry to provide resistance against water, alkalis, acids, ultraviolet light, and staining.

(60) WOOD PRESERVATIVES are coatings formulated to protect wood from decay or insect attack by the addition of a wood preservative chemical registered by the California Environmental Protection Agency.

(61) ZINC-RICH INDUSTRIAL MAINTENANCE PRIMERS are primers formulated to contain a minimum of 65 percent metallic zinc powder (zinc dust) by weight of total solids for application to metal substrates.

(c) Requirements

(1) Except as provided in paragraphs (c)(2), (c)(3), (c)(4), and specified coatings averaged under (c)(6), no person shall supply, sell, offer for sale, manufacture, blend, or repackage any architectural coating for use in the District which, at the time of sale or manufacture, contains more than 250 grams of VOC per liter of coating (2.08 pounds per gallon), less water, less exempt compounds, and less any colorant added to tint bases, and no person shall apply or solicit the application of any architectural coating within the District that exceeds 250 grams of VOC per liter of coating as calculated in this paragraph.

(2) Except as provided in paragraphs (c)(3), (c)(4), and designated coatings averaged under (c)(6), no person shall supply, sell, offer for sale, manufacture, blend, or repackage, for use within the District, any architectural coating listed in the Table of Standards which contains VOC

(excluding any colorant added to tint bases) in excess of the corresponding VOC limit specified in the table, after the effective date specified, and no person shall apply or solicit the application of any architectural coating within the District that exceeds the VOC limit as specified in this paragraph. No person shall apply or solicit the application within the District of any industrial maintenance coatings for residential use or for use in areas such as office space and meeting rooms of industrial, commercial or institutional facilities not exposed to such extreme environmental conditions described in the definition of industrial maintenance coatings; or of any rust-preventative coating for industrial use, unless such a rust preventative coating complies with the Industrial Maintenance Coating VOC limit specified in the Table of Standards.

TABLE OF STANDARDS
VOC LIMITS

Grams of VOC Per Liter of Coating,
Less Water and Less Exempt Compounds

COATING	Limit*	Effective Date								
		1/1/98	1/1/99	7/1/01	1/1/03	1/1/04	1/1/05	7/1/06	7/1/07	7/1/08
Bond Breakers	350									
Clear Wood Finishes										
Varnish	350							275		
Sanding Sealers	350							275		
Lacquer	680	550					275			
Clear Brushing Lacquer	680						275			
Concrete-Curing Compounds	350									
Dry-Fog Coatings	400									
Fire-Proofing Exterior Coatings	450		350							
Fire-Retardant Coatings										
Clear	650									
Pigmented	350									
Flats	250			100						50
Floor Coatings	420				100			50		
Graphic Arts (Sign) Coatings	500									
Industrial Maintenance (IM) Coatings	420					250		100		
High Temperature IM Coatings**					420					
Zinc-Rich IM Primers	420				340			100		
Japans/Faux Finishing Coatings	700		350							
Magnesite Cement Coatings	600		450							
Mastic Coatings	300									
Metallic Pigmented Coatings	500									
Multi-Color Coatings	420	250								
Non-Flat Coatings	250				150			50		
Pigmented Lacquer	680	550					275			
Pre-Treatment Wash Primers	780				420					
Primers, Sealers, and Undercoaters	350				200			100		
Quick-Dry Enamels	400				250			50		
Quick-Dry Primers, Sealers, and Undercoaters	350				200			100		
Recycled Coatings					250					
Roof Coatings	300				250		50			
Roof Coatings, Aluminum	500						100			

Roof Primers, Bituminous	350				350					
Rust Preventative Coatings	420				400			100		
Shellac Clear Pigmented	 730 550									
Specialty Primers	350							100		
Stains Stains, Interior	350 250				250				100	
Swimming Pool Coatings Repair Other	 650 340				 340					
Traffic Coatings	250	150								
Waterproofing Sealers	400				250			100		
Waterproofing Concrete/Masonry Sealers	400							100		
Wood Preservatives Below-Ground Other	 350 350									

* The specified limits remain in effect unless revised limits are listed in subsequent columns in the Table of Standards

** The National VOC Standard at 650 g/l is applicable until 1/1/2003

TABLE OF STANDARDS (cont.)
VOC LIMITS

Grams of VOC Per Liter of Material

COATING	Limit
Low-Solids Coating	120

(3) Coating Categorization

(A) If anywhere on the container of any coating listed in the Table of Standards, on any sticker or label affixed thereto, or in any sales or advertising literature, any representation is made that the coating may be used as, or is suitable for use as, a coating for which a lower VOC standard is specified in the table or in paragraph (c)(1), then the lowest VOC standard shall apply.

(B) The provisions of paragraph (c)(3)(A) shall not apply to a coating described in part as a flat, nonflat or primer-sealer-undercoater coating provided that all of the following requirements are met:

(i) The coating meets the definition of a specific coating category that allows a higher VOC standard, and

(ii) The coating is labeled in a manner consistent with the definition and the specific labeling requirement for that specific coating category, and

(iii) The coating is suitable and only recommended for the intended uses of that specific coating category.

(4) Any coating that is manufactured prior to the effective date of the applicable limit specified in the Table of Standards, and that has a VOC content above that limit (but not above the limit in effect on the date of manufacture), may be sold, supplied, offered for sale, or applied for up to three years after the specified effective date.

(5) All architectural coating containers used to apply the contents therein to a surface direct from said container by pouring, siphoning, brushing, rolling, padding, ragging or other means, shall be closed when not in use. These architectural coating containers include, but should not be limited to: drums, buckets, cans, pails, trays or other application containers.

(6) Averaging Compliance Option

In lieu of specific compliance with the applicable limits in the Table of Standards, manufacturers may average designated coatings such that their actual cumulative emissions from the averaged coatings are less than or equal to the cumulative emissions that would have been allowed under those limits over a compliance period not to exceed one year.

(A) On or after January 1, 2001, the following coatings may be averaged: floor coatings; primers, sealers, and undercoaters; quick-dry primers, sealers, and undercoaters; quick-dry enamels; rust preventative coatings; roof coatings; specialty primers; stains; waterproofing sealers; industrial maintenance coatings; as well as flats and non-flats (excluding recycled coatings).

(B) On or after July 1, 2006, the following coatings in addition to those designated in subparagraph (c)(6)(A) may be averaged: bituminous roof primers; interior stains; waterproofing concrete/masonry sealers; varnishes; and sanding sealers.

(C) Manufacturers using the Averaging Compliance Option shall:

(i) Comply with the averaging provisions contained in Appendix A, as well as maintain records and make these records available for inspection, for at least three years after the end of the compliance period, and

(ii) Use only the sell through provision in Appendix A for each coating included in the Program in lieu of the sell through provision of subparagraph (c)(4).

(d) Administrative Requirements

(1) Containers for all coatings subject to this rule shall display the date of manufacture of the contents or a code indicating the date of manufacture. The manufacturers of such coatings shall file with the Executive Officer of the District and the Executive Officer of the Air Resources Board an explanation of each code.

(2) Containers for all coatings subject to the requirements of this rule shall carry a statement of the manufacturer's recommendation regarding thinning of the coating. This requirement shall not apply to the thinning of architectural coatings with water. The recommendation shall specify that the coating is to be employed without thinning or diluting under normal environmental and application conditions, unless any thinning recommended on the label for normal environmental and application conditions does not cause a coating to exceed its applicable standard.

(3) Each container of any coating subject to this rule shall display the maximum VOC content of the coating, as supplied, and after any thinning as recommended by the manufacturer. The VOC content of low-solids coatings shall be displayed as grams of VOC per liter of material (excluding any colorant added to the tint bases) and the VOC content of any other coating shall be displayed as grams of VOC per liter of coating (less water and less exempt compounds, and excluding any colorant added to tint bases). VOC content displayed may be calculated using product formulation data, or may be determined using the test method in subdivision (e).

(4) The coating container label or container for quick-dry primers, sealers, and undercoaters and quick-dry enamels shall include the words “Quick-Dry” or shall list the following:

(A) The recoat time for quick-dry primers, sealers, and undercoaters, or

(B) The dry-hard time for quick-dry enamels.

Containers and container labels shall not contain the words “Quick-Dry” unless the material meets the dry times specified in the respective definitions or the material complies with the respective general VOC limit for enamels or primers, sealers, and undercoaters.

(5) The labels of all rust preventative coatings shall include the statement “For Metal Substrates Only” prominently displayed, effective January 1, 2003.

(6) Effective January 1, 2003, the labels of all specialty primers shall prominently display one or more of the following descriptions:
   (A) For fire-damaged substrates.
   (B) For smoke-damaged substrates.
   (C) For water-damaged substrates.
   (D) For excessively chalky substrates.

(7) The labels of all clear brushing lacquers shall include the statements "For brush applications only" and "This product must not be thinned or sprayed", prominently displayed, effective January 1, 2002 until January 1, 2005.

(8) Each manufacturer of the following coating categories shall, on or before April 1 of each calendar year submit an annual report to the Executive Officer:
   (A) Clear brushing lacquers until April 1, 2006.
   (B) Recycled coatings, including the gallons repackaged and distributed in the District.
   (C) Rust preventative coatings.
   (D) Specialty primers.

   The report shall specify the number of gallons of each coating within the category sold in the District during the preceding calendar year as well as their coating VOC content, and shall describe the method used by the manufacturer to calculate such sales.

(9) A manufacturer, distributor, or seller of a coating meeting the requirements of this rule, who supplies that coating to a person who applies it in a non-compliant manner, shall not be liable for that non-compliant use, unless the manufacturer, distributor, or seller knows that the supplied coating would be used in a non-compliant manner.

(10) Manufacturers of recycled coatings shall submit a letter to the Executive Officer certifying their status as a Recycled Paint Manufacturer.

(e) Test Methods

For the purpose of this rule, the following test methods shall be used:

(1) VOC Content of Coatings

The VOC content of coatings subject to the provisions of this rule shall be determined by:

(A) The United States Environmental Protection Agency (USEPA) Reference Test Method 24 (Determination of Volatile Matter Content, Water Content, Density, Volume Solids, and Weight Solids of Surface Coatings, Code of Federal Regulations Title 40, Part 60, Appendix A) with the exempt compounds' content determined by Method 303 (Determination of Exempt Compounds) in the South Coast Air Quality Management District's (SCAQMD) "Laboratory Methods of Analysis for Enforcement Samples" manual, or

(B) Method 304 [Determination of Volatile Organic Compounds (VOC) in Various Materials] in the SCAQMD's "Laboratory Methods of Analysis for Enforcement Samples" manual.

(C) Exempt Perfluorocarbons

The following classes of compounds:

cyclic, branched, or linear, completely fluorinated alkanes

cyclic, branched, or linear, completely fluorinated ethers with no unsaturations

cyclic, branched, or linear, completely fluorinated tertiary amines with no unsaturations

sulfur-containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine

will be analyzed as exempt compounds for compliance with subdivision (c), only when manufacturers specify which individual compounds are used in the coating formulations. In addition, the manufacturers must identify the USEPA, ARB, and SCAQMD approved test methods, which can be used to quantify the amount of each exempt compound.

(2) Acid Content of Coatings

The acid content of a coating subject to the provisions of this rule shall be determined by ASTM Test Method D 1613-85 (Acidity in Volatile Solvents and Chemical Intermediates Used in Paint, Varnish, Lacquer, and Related Products).

(3) Metal Content of Coatings

The metallic content of a coating subject to the provisions of this rule shall be determined by Method 311 (Determination of Percent Metal in Metallic

Coatings by Spectrographic Method) in the SCAQMD's "Laboratory Methods of Analysis for Enforcement Samples" manual.

(4) Flame Spread Index

The flame spread index of a fire-retardant coating subject to the provisions of this rule shall be determined by ASTM Test Method E 84-99 (Standard Test Method for Surface Burning Characteristics of Building Materials) after application to an organic or inorganic substrate, based on the manufacturer's recommendations.

(5) Drying Times

The set-to-touch, dry-hard, dry-to-touch, and dry-to-recoat times of a coating subject to the provisions of this rule shall be determined by ASTM Test Method D 1640 (Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature). The tack-free time of a coating subject to the provisions of this rule shall be determined by ASTM Test Method D 1640, according to the Mechanical Test Method.

(6) Gloss Determination

The gloss shall be determined by ASTM Test Method D 523 (Specular Gloss).

(7) Equivalent Test Methods

Other test methods determined to be equivalent after review by the staffs of the District, the California Air Resources Board, and the USEPA, and approved in writing by the District Executive Officer may also be used.

(8) Multiple Test Methods

When more than one test method or set of test methods are specified for any testing, a violation of any requirement of this rule established by any one of the specified test methods or set of test methods shall constitute a violation of the rule.

(9) All test methods referenced in this subdivision shall be the version most recently approved by the appropriate governmental entities.

(f) Technology Assessment

The Executive Officer shall conduct a technology assessment for the future VOC limit for the following coatings as specified in paragraph (c)(2).

(1) Flat coatings by July 1, 2007.

(2) Lacquers by January 1, 2004.

(3) Nonflats; primers, sealers, and undercoaters; quick-dry primers, sealers, and undercoaters; quick-dry enamels; waterproofing sealers; stains; floor; rust preventative; varnishes; and industrial maintenance coatings by July 1, 2005.

In conducting the above technology assessments, the Executive Officer shall consider any applicable future California Air Resources Board surveys on architectural coatings.

After each technology assessment, the Executive Officer shall report to the Governing Board as to the appropriateness of maintaining the future VOC limit.

The Executive Officer shall conduct a study to further assess reactivity of architectural coatings.

(g) Exemptions

(1) The provisions of this rule shall not apply to:

(A) Architectural coatings in containers having capacities of one quart or less, provided that the manufacturer submits an annual report to the Executive Officer within three months of the end of each calendar year. The report shall contain information as required by the Executive Officer to monitor the use of the small container exemption.

(i) From July 1, 2006 to June 30, 2008, clear wood finishes, including varnishes and sanding sealers must have a VOC content of 450 grams of VOC per liter or less, and lacquers, including pigmented lacquers must have a VOC content of 550 grams of VOC per liter or less to qualify for the small container exemption.

(ii) Effective July 1, 2008 clear wood finishes, including varnishes and sanding sealers; and lacquers, including pigmented lacquers, in containers having capacities of one quart or less shall no longer be exempt from the requirements of this rule.

The loss of this exemption due to the failure of the manufacturer to submit an annual report shall apply only to the manufacturer.

(B) Architectural coatings sold in this District for shipment outside of this District or for shipment to other manufacturers for repackaging; or

(C) Emulsion type bituminous pavement sealers; or

(D) Aerosol coating products.

(E) Use of stains and lacquers in all areas within the District at an elevation of 4,000 feet or greater above sea level.

(2) Notwithstanding the provisions of paragraph (c)(2), a person or facility may add up to 10 percent by volume of VOC to a lacquer to avoid blushing of the finish during days with relative humidity greater than 70 percent and temperature below 65 degrees Fahrenheit, at the time of application provided that:

(A) The coating is not applied from April 1 to October 31 of any year.

(B) The coating contains acetone and no more than 550 grams of VOC per liter of coating (275 grams of VOC per liter of coating after January 1, 2005), less water and exempt compounds, prior to the addition of VOC.

(3) The January 1, 2005 VOC limit for lacquers shall not be applicable until January 1, 2007 and the July 1, 2008 VOC limit for flat coatings shall not be applicable to any manufacturer which meets all of the following criteria:

(A) The total gross annual receipts are $2,000,000 or less, and

(B) The total number of employees is 100 or less, and

(C) The manufacturer requesting this exemption files a written request with the Executive Officer annually which includes, but is not limited to:

(i) The total gross annual receipts for each of the last three years.

(ii) The total number of employees for each of the last three years.

For the purposes of determining the total gross annual receipts and the total number of employees, a manufacturer shall include data from all facilities (both within and outside of the District) which they own, operate, have an ownership interest, or are legally affiliated. If a manufacturer exceeds the criteria specified in subparagraphs (g)(3)(A) or (g)(3)(B) any time after the initial request is filed with the Executive Officer, this exemption shall be immediately terminated, the manufacturer shall forfeit any future eligibility for this exemption, and the manufacturer shall be considered in violation of this rule for each and every day that lacquers or flat coatings which do not comply with the respective VOC limit in the Table of Standards are supplied, sold, or offered for sale within the District. The loss of this exemption due to the manufacturer exceeding the criteria in subparagraphs (g)(3)(A) or (g)(3)(B) shall apply only to the manufacturer.

(4) The provisions of paragraph (c) shall not apply to facilities which apply coatings to test specimens for purposes of research and development of those coatings.

(5) The July 1, 2006 VOC limit for nonflats, primers, sealers, and undercoaters, quick-dry enamels, waterproofing concrete/masonry sealers and rust-preventative coatings shall not be applicable until July 1, 2008 to any manufacturer which meets all of the following criteria:

(A) The total gross annual receipts are $5,000,000 or less, and

(B) The total number of employees is 100 or less, and

(C) The manufacturer requesting this exemption files a written request with the Executive Officer annually which includes, but is not limited to:

(i) The total gross annual receipts for each of the last three years.

(ii) The total number of employees for each of the last three years.

For the purposes of determining the total gross annual receipts and the total number of employees, a manufacturer shall include data from all facilities (both within and outside of the District) which they own, operate, have an ownership interest, or are legally affiliated. If a manufacturer exceeds the criteria specified in subparagraphs (g)(5)(A) or (g)(5)(B) any time after the initial request is filed with the Executive Officer, this exemption shall be immediately terminated, the manufacturer shall forfeit any future eligibility for this exemption, and the manufacturer shall be considered in violation of this rule for each and every day that nonflats, primers, sealers, and undercoaters, quick-dry enamels, and rust-preventative coatings do not comply with the respective VOC limit in the Table of Standards are supplied, sold, or offered for sale within the District. The loss of this exemption due to the manufacturer exceeding the criteria in subparagraphs (g)(5)(A) or (g)(5)(B) shall apply only to the manufacturer.

(6) Effective January 1, 2005 through December 31, 2006, roof coatings with a VOC content of 100 grams per liter or less that are certified under the USEPA Energy Star Program shall not be subject to the VOC limit in the Table of Standards.

APPENDIX A: Averaging Provision

(A) The manufacturer shall demonstrate that actual emissions from the coatings being averaged are less than or equal to the allowable emissions, for the specified compliance period using the following equation:

$$\sum_{i=1}^{n} GiMi \leq \sum_{i=1}^{n} GiViLi$$

Where:

$\sum_{i=1}^{n} GiMi$	=	Actual Emissions
$\sum_{i=1}^{n} GiViLi$	=	Allowable Emissions
Gi	=	Total Gallons of Product (i) subject to Averaging;
Mi	=	Material VOC content of Product (i), as pounds per gallon; {as defined in paragraph (b)(21)}
Vi	=	Percent by Volume Solids and VOC in Product (i), {as defined in paragraph (b)(20)}
	=	$\dfrac{Vm - Vw - Ves}{Vm}$
		For Non-Zero VOC Coatings:
	=	$\dfrac{\text{Material VOC}}{\text{Coating VOC}}$
		For Zero VOC coatings:
	=	% solids by volume
Li	=	Regulatory VOC Content Limit for Product (i), as pounds per gallon; {as listed in paragraph (c)(2) Table of Standards}

The averaging is limited to coatings that are designated by the manufacturer. Any coating not designated in the averaging Program shall comply with the VOC limit in the Table of Standards. The manufacturer shall not include any quantity of coatings that it knows or should have known will not be used in the District.

In addition to the requirements specified in Section (A), a manufacturer shall not include in an Averaging Program any coating with a VOC content in excess of the maximum VOC content in effect, immediately prior to July 1, 2001 or the VOC content limits specified in the National VOC Emission Standard, whichever is less. Manufacturers that submitted an annual exemption report in 2002 for quick-dry primers, sealers and undercoaters and included those coatings in their most recent approved Averaging Compliance Option Program, may continue to average those coatings until July 1, 2006, so long as these coatings do not exceed 450 grams of VOC per liter of coating less water and less exempt compounds, in lieu of the otherwise applicable VOC limit of 350 grams per liter.

(B) Averaging Program (Program)

At least six months prior to the start of the compliance period, manufacturers shall submit an Averaging Program, which is subject to all the provisions of Rule 221 – Plans and Rule 306 – Plan Fees, to the Executive Officer. Averaging may not be implemented until the Program is approved in writing by the Executive Officer.

Within 45 days of submittal of a Program, the Executive Officer shall either approve, disapprove or deem the Program incomplete. The Program applicant and the Executive Officer may agree to an extension of time for the Executive Officer to take action on the Program.

(C) General Requirements

The Program shall include all necessary information for the Executive Officer to make a determination as to whether the manufacturer may comply with the averaging requirements over the specified compliance period in an enforceable manner. Such information shall include, but is not limited to, the following:

1. An identification of the contact persons, telephone numbers, and name of the manufacturer who is submitting the Program.
2. An identification of each coating that has been selected by the manufacturer for inclusion in this program that exceeds the applicable VOC limit in the Table of Standards, their VOC content specified in units of both grams of VOC per liter of coating, and grams of VOC per liter of material and the designation of the coating category.
3. A detailed demonstration showing that the projected actual emissions will not exceed the allowable emissions for a single compliance period that the Program will be in effect. In addition, the demonstration shall include

VOC content information for each coating that are below the compliance limit in the Table of Standards. The demonstration shall use the equation specified in paragraph (A) of this Appendix for projecting the actual emissions and allowable emissions during each compliance period. The demonstration shall also include all VOC content levels and projected volume within the District for each coating listed in the Program during each compliance period. The requested data can be summarized in a matrix form.

4. A specification of the compliance period(s) and applicable reporting dates. The length of the compliance period shall not be more than one year nor less than six months.

5. An identification and description of all records to be made available to the Executive Officer upon request, if different than those identified under paragraph (c)(6). Records to track volume and to demonstrate compliance shall be included. Such records may include, but are not limited to, distribution records (shipping manifests, bills of lading, etc.), point of sale receipts, invoices to local distributors, composition reports, production batch tickets, computer summaries of the data with paper records available for detailed information, and records of VOC calculations. If the type of records submitted are not specifically listed above, those records must be approved by the USEPA, ARB, and the Executive Officer before an Averaging Program can be approved.

6. An identification and description of specific records to be used in calculating emissions for the Program and subsequent reporting, and a detailed explanation as to how those records will be used by the manufacturer to verify compliance with the averaging requirements.

7. A statement, signed by a responsible party for the manufacturer, that all information submitted is true and correct, and that records will be made available to the Executive Officer upon request.

(D) Reporting Requirements

1. For every single compliance period, the manufacturer shall submit a mid-term report listing all coatings subject to averaging during the first half of the compliance period, detailed analysis of the actual and allowable emissions at the end of the mid-term, and if actual emissions exceed allowable emissions an explanation as to how the manufacturer intends to achieve compliance by the end of the compliance period. The report shall

be signed by the responsible party for the manufacturer, attesting that all information submitted is true and correct. The mid-term report shall be submitted within 45 days after the midway date of the compliance period. A manufacturer may request, in writing, an extension of up to 15 days for submittal of the mid-term report.

2. Within 60 days after the end of the compliance period or upon termination of the Program, whichever is sooner, the manufacturer shall submit to the Executive Officer a final report, providing a detailed demonstration of the balance between the actual and allowable emissions for the compliance period, an update of any identification and description of specific records used by the manufacturer to verify compliance with the averaging requirement, and any other information requested by the Executive Officer to determine whether the manufacturer complied with the averaging requirements over the specified compliance period. The report shall be signed by the responsible party for the manufacturer, attesting that all information submitted is true and correct, and that records will be made available to the Executive Officer upon request. A manufacturer may request, in writing, an extension of up to 30 days for submittal of the final report.

(E) Renewal of a Program

A Program automatically expires at the end of the compliance period. The manufacturer may request a renewal of the Program by submitting a renewal request that shall include an updated Program, meeting all applicable Program requirements. The renewal request will be considered conditionally approved until the Executive Officer makes a final decision to deny or approve the renewal request based on a determination of whether the manufacturer is likely to comply with the averaging requirements. The Executive Officer shall base such determination on all available information, including but not limited to, the mid-term and final reports of the preceding compliance period. The Executive Officer shall make a decision to deny or approve a renewal request no later than 45 days from the date of the final report submittal, unless the manufacturer and the Executive Officer agree to an extension of time for the Executive Officer to take action on the renewal request.

(F) Modification of a Program

A manufacturer may request a modification of the Program at any time prior to the end of the compliance period. The Executive Officer shall take action to approve or disapprove the modification request no longer than 45 days from the date of its submittal. No modification of the compliance period shall be allowed. A Program need not be modified to specify additional coatings to be averaged that are below the applicable VOC limits.

(G) Termination of a Program

1. A manufacturer may terminate its Program at any time by filing a written notification to the Executive Officer. The filing date shall be considered the effective date of the termination, and all other provisions of this rule including the VOC limits shall immediately thereafter apply. The manufacturer shall also submit a final report 60 days after the termination date. Any exceedance of the actual emissions over the allowable emissions over the period that the Program was in effect shall constitute a separate violation for each day of the entire compliance period.
2. The Executive Officer may terminate a Program if any of the following circumstances occur:
   (a) The manufacturer violates the requirements of the approved Program, and at the end of the compliance period, the actual emissions exceed the allowable emissions.
   (b) The manufacturer demonstrates a recurring pattern of violations and has consistently failed to take the necessary steps to correct those violations.

(H) Change in VOC Limits

If the VOC limits of a coating listed in the Program are amended such that its effective date is less than one year from the date of adoption, the affected manufacturer may base its averaging on the prior limits of that coating until the end of the compliance period immediately following the date of adoption.

(I) Labeling

Each container of any coating that is included in averaging program, and that exceeds the applicable VOC limit in the Table of Standards shall display the following statement: "This product is subject to the averaging provisions of

SCAQMD Rule 1113". A symbol specified by the Executive Officer may be used as a substitute.

(J) Violations

The exceedance of the allowable emissions for any compliance period shall constitute a separate violation for each day of the compliance period. However, any violation of the requirements of the Averaging Provision of this rule, which the violator can demonstrate, to the Executive Officer, did not cause or allow the emission of an air contaminant and was not the result of negligent or knowing activity may be considered a minor violation (pursuant to District Rule 112).

(K) Sell Through Provision

A coating that is included in an approved Averaging Program that does not comply with the specified limit in the Table of Standards may be sold, supplied, offered for sale, or applied for up to three years after the end of the compliance period specified in the approved Averaging Program. This section of Appendix A does not apply to any coating that does not display on the container either the statement: "This product is subject to architectural coatings averaging provisions of the SCAQMD Rule 1113" or a designated symbol specified by the Executive Officer of the SCAQMD.

A T T A C H M E N T G

STAFF REPORT FOR

PROPOSED AMENDED RULE 1113 - ARCHITECTURAL COATINGS

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

FINAL STAFF REPORT FOR

PROPOSED AMENDED RULE 1113 – ARCHITECTURAL COATINGS

Dated: December 5, 2003

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EXECUTIVE

SUMMARY

EXECUTIVE SUMMARY

Rule 1113 - Architectural Coatings was originally adopted by the South Coast Air Quality Management District (AQMD) on September 2, 1977, to regulate the volatile organic compound (VOC) emissions from the application of architectural coatings.

Proposed Amended Rule (PAR) 1113 – Architectural Coatings has been developed to implement Control Measure CTS-07 of the 2003 Air Quality Management Plan (AQMP). The control measure proposes to further reduce volatile organic compound (VOC) emissions from various architectural coating categories and thinning and cleanup solvents used in the architectural and industrial maintenance coating industry.

The proposed amendments will lower the current VOC limit for the following specialty coating categories: clear wood finishes including varnishes and sanding sealers, roof coatings, stains, and waterproofing sealers including concrete and masonry sealers. The proposed VOC limits will become effective January 1, 2005 for roof coatings United States Environmental Protection Agency (USEPA) Energy Star certified roof coatings of 100 g/l or less, January 1, 2007), July 1, 2006 for clear wood finishes and waterproofing sealers and July 1, 2007 for exterior stains. The exemption for quart containers or less from having a VOC limit, is proposed to be eliminated for the coating category clear wood finishes, effective July 1, 2006. Based on discussions with industry, staff is also considering an alternate proposal that phases out the exemption in July 2008, and in the interim, establishes maximum VOC limits for clear wood coatings in those containers. The proposal also includes a three-year existing product sell through provision and applicability of the averaging compliance option to include these coating categories. The reduction in VOC emissions from the use of cleanup solvents will be addressed in a separate amendment to Rule 1171, Solvent Cleaning Operations.

The emission reductions associated with proposed changes are estimated to be 3.73 tons per day VOC. The cost-effectiveness is expected to range between $4,229 and $11,405 per ton of VOC reduced.

The proposed amendments to Rule 1113 will be reviewed pursuant to the California Environmental Quality Act (CEQA) and an Environmental Assessment (EA) has been prepared and will be considered for certification concurrently with the consideration for adoption of PAR 1113. A Socioeconomic Assessment has been completed and is included as an attachment to the Board Letter recommending adoption of Proposed Rule 1113.

CHAPTER I

BACKGROUND

A. AQMP CONTROL MEASURE

Control Measure CTS-07 of the 2003 AQMP proposes to further reduce VOC emissions from various architectural coating categories and thinning and cleanup solvents used in the architectural and industrial maintenance coating industry. This control measure was also part of the 1999 Amendment to the 1997 Ozone State Implementation Plan (SIP) Revision for the South Coast Air Basin (SCAB), which is also consistent with the settlement agreement for the 1997 litigation between the AQMD and the Natural Resources Defense Council, the Coalition for Clean Air and Communities for a Better Environment. Architectural coatings and thinning and cleanup solvents are regulated by AQMD Rule 1113 and Rule 1171 – Solvent Cleaning Operations, respectively.

B. RULE HISTORY

Architectural and Industrial Maintenance (AIM) coatings are one of the largest non-mobile sources of VOC emissions in the AQMD. Rule 1113 is applicable to manufacturers, distributors, and end-users of architectural coatings. These coatings are used to enhance the appearance of and to protect homes, office buildings, factories and other structures, and their appurtenances on a variety of substrates. The coatings may be applied primarily by brush, roller, or spray guns; and those applying those coatings include homeowners, painting contractors, or maintenance personnel. The rule was first adopted in 1977, and has undergone numerous amendments since then.

The VOC emissions from the use of architectural coatings were estimated at 56.3 tons per day (tpd) in 1993 in the AQMD on an Annual Average Inventory, and 66.4 tpd on the Summer Planning Inventory. Based on the 1999 AQMP, these emissions for 2006 and 2010 are projected at 64.2 tpd and 67.3 tpd respectively on the Annual Average Inventory, and at 75.7 tpd and 79.4 tpd on the Summer Planning Inventory, without additional controls on architectural coatings. In 1999, the AQMD entered into a consent decree that committed to additional emission reductions from the use of architectural coatings.

VOC emissions cause the formation of ozone and PM_{10} (particulate matter less than 10 microns in size), two pollutants that exceed the state and national ambient air quality standards. They are the AQMDs most serious regional air quality problems and the most difficult to reduce to healthful levels.

VOCs react photochemically with oxides of nitrogen (NOx) to form ozone. Ozone is a strong oxidizer that irritates the human respiratory system and damages plant life and property. VOCs also react in the atmosphere to form PM_{10}, a pollutant that adversely affects human health and limits visibility. Because these small particulates penetrate into the deepest regions of the lung, they affect pulmonary function and have even been linked to an increased number of deaths.

The California Air Resources Board (CARB) developed a revised suggested control measure (SCM) for architectural coatings in June 2000, that was largely based on the interim limits and the averaging provision of Rule 1113, as amended in May 1999. The provisions in the SCM were developed by a consortium of California air pollution control districts, CARB, USEPA Region IX, and paint manufacturers. The SCM, which has January 1, 2003 as the main compliance date for most coating categories, has been adopted by 22 of the 35 local air districts in California.

Listed below are the Air Pollution Control Districts or Air Quality Management Districts in California with architectural coating rules in effect. The remaining districts without an architectural coating rule are covered by the USEPA's National Architectural Coatings Rule.

CA Districts with Architectural Coating Rules

Antelope Valley Air Pollution Control District	Bay Area Air Quality Management District
Butte County Air Quality Management District	Colusa County Air Pollution Control District
El Dorado County Air Pollution Control District	Feather River Air Quality Management District
Imperial County Air Pollution Control District	Kern County Air Pollution Control District
Mojave Desert Air Quality Management District	Monterey Bay Unified Air Pollution Control District
Northern Sonoma Air Pollution Control District	Placer County Air Pollution Control District
Sacramento Metropolitan Air Quality Management District	San Diego County Air Pollution Control District
San Joaquin Valley Unified Air Pollution Control District	San Luis Obispo County Air Pollution Control District
Santa Barbara County Air Pollution Control District	Shasta County Air Quality Management District
South Coast Air Quality Management District	Tehama County Air Pollution Control District
Ventura County Air Pollution Control District	Yolo-Solano County Air Quality Management District

CHAPTER II

PROPOSED AMENDMENTS

PROPOSED AMENDMENTS

Selection of Coating Categories

In selecting coating categories feasible for lower VOC limits, staff reviewed all coating categories and established a priority list, based upon availability of technology, to reduce VOC emissions. Those categories selected for this amendment were feasible based upon the available data. Those categories not selected at this time are still under evaluation and may be considered for future amendments. The following generally summarizes the steps taken in the selection process.

First, all coating categories in the Rule 1113 Table of Standards that had a current or future VOC limit of 100 grams per liter (g/l) or less were excluded from consideration. This was done because the limits are already low and probably reflect a high usage of waterborne or exempt solvent usage.

In the second step, staff evaluated the results of the recent CARB architectural coating surveys for emission inventories and the technology demonstrated by the AVES Study prepared by an AQMD contractor (AVES) hired to develop and demonstrate zero- and low-VOC resin technology in support of Control Measure – CTS-07. Based on the results of this project and data from the CARB 1998 Architectural Coatings Survey and the preliminary draft of the CARB 2001 Architectural Coatings Survey, staff analyzed the following ten coating categories: clear wood finishes, clear brushing lacquers, roof coatings, roof primers, rust preventative coatings, shellacs, stains, wood preservatives, waterproofing sealers and waterproofing concrete/masonry sealers. However, after a preliminary evaluation of the emission inventory and available VOC technology for these ten categories, it appeared that lowering the VOC limits for only clear wood finishes, stains, waterproofing sealers, roof coatings and waterproofing concrete/masonry sealers would result in significant cost-effective emission reductions. The other five coating categories represented a very small portion of the total Rule 1113 inventory, and were not considered further for this amendment. These categories may be further evaluated in the future to determine if they could provide sufficient and cost-effective emission reductions.

Staff has analyzed the 1998 Survey and the Draft 2001 Survey, to identify coating categories with larger sales volume, high VOC limits and available low-VOC technologies. To better understand how significant the impact of the proposed amendments would be on the manufacturers, staff compiled Table II-1, showing the market penetration of coatings already compliant with the proposed VOC limits, based on the data from the 2001 Survey. A noteworthy mention is that, since the survey was taken in 2000, low VOC products that have been developed and marketed since then are not reflected in these results and the market penetration percentages listed in the table for the low-VOC products may actually be higher today. This was evident when staff compiled Appendix A and several low VOC products were found in addition to those listed in the Survey for the categories proposed for amendment. The table also lists the number of manufacturers and products for each VOC segment (at or below proposed limit and above) for each coating category proposed for amendment. The market penetration was calculated based on sales volumes, excluding quart containers or less and low-solids products, provided by the Survey.

Table II-1 – CA Market Penetration[1]

VOC Range (g/l)	# of Manufacturers	# of Products	Percent of Products	CA Sales Volume(gal)	Percent of Sales Volume	Current Limit	Proposed Limit
Clear Wood Finishes[2]							
0-275	21	53	21%	236,557	36%	350	275
>275	36	198	79%	427,857	64%		
Sanding Sealers							
0-275	7	7	70%	5,831	36%	350	275
>275	3	3	30%	10,267	64%		
Roof Coatings (Including Bituminous)							
0-50	16	49	28%	2,216,210	51%	250	50
>50	40	129	72%	2,158,653	49%		
Stains – Exterior							
0-100	15	41	11%	300,271	11%	250	100
>100	36	320	89%	2,396,524	89%		
Waterproofing Sealers							
0-100	17	39	34%	139,472	20%	250	100
>100	27	75	66%	550,377	80%		
Waterproofing Concrete/Masonry Sealers							
0-100	15	49	57%	257,837	38%	400	100
>100	19	37	43%	414,406	62%		

1 Data Compiled from the 2001 Survey
2 Including volume sold in quart and smaller containers, percent of volume in compliance with proposed limit of 275 g/l is 21%

Based on this analysis, staff has determined that the coating categories listed in Table II-1 warranted further consideration since they represent some of the highest sales volume and produce some of the highest VOC emissions of the remaining coating categories. In Chapter IV, Table IV-1 shows total sales volume, including all container sizes as well as high- and low-solids products and emissions from both waterborne and solventborne coatings for these categories.

Based on the approach and data discussed above, staff proposes amending Rule 1113 as follows:

- Add or modify definitions.
- Reduce the VOC content limits to become effective for the following coating categories:

  Clear wood finishes, including varnishes and sanding sealers July 1, 2006

  Roof coatings January 1, 2005 (USEPA Energy Star certified coatings of 100 g/l or less, January 1, 2007)

  Waterproofing sealers, including concrete/masonry sealers July 1, 2006

  Stains other than interior stains July 1, 2007.
- Clarify the conditions under which a coating is subject to the most restrictive VOC standard.

- Expand the scope of the Averaging Compliance Option to include the categories that are proposed for a change of VOC limits.

- Modify administrative requirements, including consolidation of administrative requirements in other sections of the rule, to this subdivision.

- Add varnishes to the Technical Assessment for July 1, 2005.

- Delete and modify certain exemptions, including a sunset date for the small container exemption for clear wood finishes.

Definitions

New or modified definitions are proposed in subdivision (b) for:

Aluminum Roof Coatings, which are defined as roof coatings containing at least 0.7 pounds per gallon (84 g/l) of elemental aluminum pigment. This definition was added to allow more options in selecting roof coatings besides acrylic white reflective coatings and is consistent with the 2005 California Title 24 Building Energy Efficiency Standards and the voluntary USEPA "Energy Star" program.

Interior Stains, which are defined as stains formulated for use on interior surfaces only. Stains that are formulated for use on exterior surfaces or have dual use (both interior and exterior) remain under the current definition for stains. Data on technology does not support a reduced VOC limit for interior stains at this time. However, lower VOC technology is available for other stain applications.

The definition for Industrial Maintenance Coatings was modified for clarification, by removing the use prohibition and placing it under Requirements in paragraph (c)(2).

The definition for Metallic Pigmented Coatings was modified to clarify that roof coatings, regardless of their metallic pigment content, are not included in this category.

Conversely, the definition for Roof Coatings was modified to clarify that this category includes metallic pigmented roof coatings.

The definition for Quick-Dry Enamels was expanded to clarify that the gloss determination is as measured upon application of the coating.

The definition of Recycled Coatings was modified to clarify that recycled coatings must be manufactured by a certified recycled paint manufacturer.

VOC Limits

New VOC limits are proposed in the Table of Standards in paragraph (c)(2) for roof coatings, effective as of January 1, 2005; for clear wood finishes, including varnishes and sanding sealers, waterproofing sealers, including concrete/masonry sealers, effective July 1, 2006; and stains effective July 1, 2007, as follows:

TABLE OF STANDARDS

VOC LIMITS

Grams of VOC Per Liter of Coating,
Less Water and Less Exempt Compounds

COATING	Current Limit*	Effective Date		
		1/1/05	7/1/06	7/1/07
Clear Wood Finishes	350		275	
Varnish	350		275	
Sanding Sealers	350		275	
Roof Coatings	250	50		
Roof Coatings, Aluminum	500	100		
Stains	250			100
Stains, Interior	250			
Waterproofing Sealers	250		100	
Waterproofing Concrete/Masonry Sealers	400		100	

* The specified limits remain in effect unless revised limits are listed in subsequent columns in the Table of Standards

The footnote for the applicable limit for quick-dry primers, sealers and undercoaters has been deleted, since the exemption requiring the report expired on January 1, 2003.

Coating Categorization Requirement

Under the coating categorization requirement, whenever two coating categories apply, the product is required to comply with the VOC standard for the lower limit of the two. New language is proposed to clarify that for flats, non-flats, primers, sealers and undercoaters, the lowest VOC standard does not apply under certain conditions. The coating has to meet all the requirements below in order to qualify:

- The coating meets the definition of a specific coating category that allows a higher VOC standard, and
- The coating is labeled in a manner consistent with the definition and the specific labeling requirement for that specific coating category, and
- The coating is suitable and only recommended for the intended uses of that specific coating category.

Averaging Compliance Option

On November 8, 1996, the AQMD adopted the Averaging Compliance Option (ACO) as a flexibility option in the rule for the flat coating category only. Further amendments on May 14, 1999, included numerous other categories to provide manufacturers additional compliance flexibility with the future limits. As a result of those amendments, beginning January 1, 2001, manufacturers have been allowed to average their emissions; as long as their actual cumulative emissions from the averaged coatings are less than or equal to the cumulative emissions that would have been allowed under those limits over a compliance period not to exceed one year.

During the development of revisions to the ACO Guidance Document in 2002, questions were raised relative to maximum VOC content, or a VOC ceiling limit specific to coatings included in a typical averaging program. Although not specifically addressed in the rule, it has always been staff's intent to have the VOC limits in existence before the amendments to serve as the maximum VOC content for those categories. These ceiling limits were reflected in the ACO Guidance document.

A compromise was reached with those manufacturers that utilized an exemption by submitting annual reports for 2001 for the Quick-Dry Primers, Sealers, and Undercoaters category that wished to average those products as part of their ACO Plan for 2002 and 2003. A ceiling limit of 450 g/l was allowed in order to conform to the CARB Statewide Averaging Program. With the sunset of the exemption for this category on January 1, 2003, all coating manufacturers must now meet the 200 g/l VOC limit as stated in the Table of Standards for Rule 1113. As such, the previous high limit of 350 g/l shall apply for manufacturers wishing to take advantage of the ACO. The few manufacturers that previously submitted plans for this category at the 450 g/l ceiling limit have expressed concern that they have not been given enough time to reformulate their products in this category, as they had assumed that they would continue to be allowed to average at the higher ceiling limit. The AQMD has agreed to allow those manufacturers to remain at the higher limit until July 1, 2006, at which time they will need to attain the ceiling limit of 350 g/l for averaging purposes, as well all other manufacturers wishing to average coatings in this category at that time. The limit for this category will be 100 g/l beginning July 1, 2006. Since there are many coatings currently available that already meet and have a VOC content much less than the future limit, the AQMD believes that this additional time should give those few manufacturers the necessary additional time to reformulate.

New language has been added in subparagraph (c)(6)(B) to allow manufacturers to use the ACO for several additional categories of coatings, such as bituminous roof primers, interior stains, waterproofing concrete/masonry sealers, varnishes and sanding sealers, on or after July 1, 2006. In addition, staff clarified in clause (c)(6)(C)(ii) that manufacturers using the ACO shall use the sell through provisions in Appendix A of the rule rather than those in paragraph (c)(4).

Administrative Requirements

In paragraph (d)(4) staff removed an obsolete compliance effective date.

Staff proposes that exemptions from annual reporting requirements for several coating categories, currently listed under paragraphs (g)(2), (g)(5) and (g)(9), be moved to Administrative Requirements for clarification and better rule structure under paragraph (d)(8). In addition to clear brushing lacquers, for which the reporting requirement has a sunset provision of April 1, 2006, sales for the following categories of coatings are required to be reported on an annual basis: recycled coatings, including the gallons repackaged and distributed in the District, rust preventative coatings and specialty primers. The requirement to report sales of architectural coatings in containers of one quart or less exceeding the VOC limits in paragraph (c)(1) is retained in paragraph (g)(1)

Staff also proposes to delete the exemption for manufacturers of recycled coatings certification under paragraph (g)(5) and move it under Administrative Requirements as a new paragraph (d)(10) for better rule structure.

Technology Assessment

Staff is proposing to expand the scope of the rule mandated technology assessment by including varnishes. The assessment is to be conducted no later than July 1, 2005.

Exemptions

During the emission inventory review phase, staff found that a significant volume of clear wood finishes was sold in quart containers or smaller, with VOC contents much higher than the current rule limits for that coating category. In addition, the relative sales volume in small containers compared to other containers, appears to be growing across the industry. Staff concluded that a phase-out of this exemption could translate in a significant emission reduction and close a current loophole in the rule. Therefore, in subparagraph (g)(1)(A), staff proposes to sunset the small container exemption for clear wood finishes including varnishes, sanding sealers and lacquers, as well as pigmented lacquers, effective July 1, 2006.

Staff is also considering an alternate proposal (Version 2) requested by the clear wood coatings manufacturers, to allow the phase-out of the small container exemption on July 1, 2008 and institute interim VOC limits between July 1, 2006 and June 30, 2008, with a maximum content of 450 g/l VOC for varnishes and sanding sealers and 550 g/l VOC for lacquers including pigmented lacquers. The phase-out period would allow a transition period for manufacturers to achieve customer acceptance of the lower VOC products. Based upon the quart container sales data submitted to the AQMD, this phenomenon occurred with some manufacturers when the VOC limit for varnishes was lowered to its current limit. Staff did not find a trend or relative growth in sales for small containers in other coating categories and most coating categories have a relative low volume of sales in small containers. Staff therefore does not recommend amendment of the small container exemption for other coating categories but will continue to track usage in small containers.

The exemption for quick-dry primers, sealers and undercoaters has expired and the language for that exemption has been deleted from the rule.

The exemption authorizing the limited thinning of lacquers under certain conditions was adjusted to reflect the VOC limit change for lacquers on January 1, 2005.

Staff proposes to add the waterproofing concrete/masonry sealers to the coatings listed in paragraph (g)(5), allowing manufacturers of these coatings meeting the qualification requirements an extension to the effective date of compliance, from July 1, 2006 until June 30, 2008.

Staff proposes that, effective January 1, 2005 through December 31, 2006, roof coatings that are USEPA Energy Star certified and with a VOC content of 100 g/l or less, be exempt from the VOC limit in the Table of Standards.

Other changes to the exemption sections involve moving certain exemptions under Administrative Requirements for better rule structure, as outlined above.

C H A P T E R III

CONTROL TECHNOLOGY

Because VOC emissions from architectural coatings are significant and contribute to the severe air pollution problem in the AQMD, staff continually evaluates ways to reduce their inventory and bring the basin in compliance with the state and federal ambient air quality standards. Several approaches are used by staff to achieve this goal, such as reviewing commercially-available zero- and low-VOC coatings that meet the current VOC limits established in Rule 1113. In order to obtain additional information on application and durability characteristics of the low- and zero-VOC coatings the AQMD has previously contracted with several companies, such as NTS, KTA-TATOR, and AVES, to conduct side-by-side comparison studies of zero-, low-, and high-VOC coatings. The results of the studies supported staff's assessment that the low- and zero-VOC products are available today and perform equivalent to or better than their higher-VOC counterparts for some key durability characteristics. In addition, staff has performed and continues to perform its own technology assessment of these low- and zero-VOC coatings. An additional approach used is to analyze technical data sheets (TDS) and material safety data sheets (MSDS) published by coating manufacturers. A summary of this assessment is in Appendix A, listing compliant coatings that range from zero-VOC to the current VOC limits established in the Table of Standards. Staff will continue to add TDS and MSDS as new information is found. After evaluating the available data, staff concluded that the proposed limits are feasible and that zero- and low-VOC coatings are available in the market and in use today.

Staff also evaluated transfer efficiency, eliminating rule exemptions, and use of low VOC clean-up solvents as ways to reduce the emissions inventory from this source. All these approaches are further discussed in this chapter.

A. TECHNOLOGY ASSESSMENT

AVES Study

The 1997 AQMP included Phase III of the control measure for architectural coatings as a long-term measure, with need for technology development and advancement. Therefore, in May 1999, the AQMD issued a Request for Proposal to develop, test, and demonstrate zero- and low-VOC coatings under the stains, waterproofing sealers, and clear wood finishes categories. Subsequently, the AQMD awarded a contract to AVES, an affiliate of ATC Associates Inc., to develop architectural coatings with a zero- or near zero-VOC content. The scope of the project was to develop several coatings that would be used commercially in relatively large volumes, and demonstrate their technical, environmental and economic feasibility to further reduce VOC emissions. The coatings developed under this project were: opaque stains, exterior and interior semi-transparent stains, waterproofing sealers (clear), clear wood finishes (lacquers, varnishes, and sanding sealers).

The following is a summary of the AVES Study. The full report including the test methods, the results of side-by-side comparison testing, photographs from touch-up and repair testing, field demonstration forms, and product data sheets may be obtained by contacting the AQMD.

In the past, products developed and marketed have typically attempted to increase emulsion molecular weight in order to enhance film properties but also required solvents to help the polymer to coalesce. ADCO, a subcontractor to AVES, patented innovation-RESILEX®, a resin emulsion in water that alters the distribution of the molecular weights of a resin and results in an innovative technology and product which has four unique properties: (1) a unique distribution of molecular weights; (2) the presence of a unique high molecular weight polymer which is insoluble in many strong organic solvents yet is soluble in this resin emulsion; (3) the ability to coalesce at temperatures below their normal glass transition temperature when added to other waterborne polymers; and (4) a superior binder system for the formation of a high performance coating.

RESILEX® was engineered as the next step beyond conventional waterborne emulsion systems. Based on earlier test results of this resin system, ADCO's technology provides a solvent-free, water-borne polymer that exhibits, in a final paint film, better film properties (hardness, flexibility, chemical resistance, and overall durability) than even some of the newest emulsions on the market. Unlike most zero-VOC coatings, ADCO's polymer had better UV radiation resistance and flexibility while maintaining superior hardness. RESILEX® is colorless, odorless, and VOC- and hazardous air pollutant (HAP)-free. RESILEX® can be used (1) as a resin system alone, (2) in combination with other waterborne resin systems, or (3) as an enhancement in latex paint formulations to provide greater durability. The RESILEX technology is currently being used by Rustoleum Corporation, a national company, to manufacture the commercially-available line of products known as Sierra Performance, a high performance zero-VOC line for light industrial and interior/exterior uses.

In addition, the AVES/ADCO team used a non-yellowing urethane acrylic resin that provides excellent falling sand and high impact resistance to coating and adhesive formulations. The resin was used as a base resin or combined with various monomers. This resin system offers exceptional flexibility, clarity, and excellent heat and light stability to UV/EB cured products.

The task to develop these coatings was focused on making the necessary formulation adjustments to ADCO's patented polymer emulsion. This emulsion was used as the basis for formulating the required stains, sealers, and clear wood finishes while producing products with VOCs less than 10 g/l (calculated from GC/MS analysis results).

The target in developing the coatings was to achieve a performance level equal to or better than that of similar coatings widely sold and used by the industry. The performance characteristics in the new coatings were focused on the following areas: hardness, hot/cold check, adhesion, printing/blocking, household chemical resistance, drying time, moisture resistance, UV resistance, freeze/thaw, orange peel, leveling, sagging, film thickness, mildew/fungus resistance, dirt pick-up, substrate penetration, stain blocking, water repellant efficiency, beading, swelling, moisture vapor transmission, scrape/mar resistance, color change, sprayability, clarity, depth, gloss, graininess, etc.

The characteristics of the raw materials are of great importance to the creation of a waterborne resin system that dries quickly and exhibits good initial film properties without coalescing solvents. Particle size, minimum film forming temperature, glass transition temperature, resin polarity, and dynamic surface tension are among the most important factors to consider in the formulation.

The new zero-VOC lacquer is a water reducible, air-dry polyurethane and acrylic copolymer. This approach includes blending of pre-existing commercial and proprietary polymers and creating hybrid polymers (graft) prior to dispersion in water.

The new zero-VOC clear wood topcoat is a two-part, chemically cured, water reducible, air-dry epoxy coating. It can be used as a sealant and as a high gloss, durable topcoat giving a clear finish. The two part varnish consists of RESILEX® (Part A), and curing agents (Part B). The absence of organic solvents in the formulation or their formation during curing results in zero emission of VOCs and HAPs. Various mixing ratios were evaluated for each Part A/Part B combination, and the best ratio was selected for further evaluation.

The new zero-VOC waterproofing sealer is a water reducible, air-dry special hydrophobic acrylic copolymer. The new waterproofing sealer is a clear, waterborne protective coating for use on many types of surfaces, including wood and concrete. It seals, waterproofs, and dustproofs the surface.

The zero-VOC sanding sealer is a water reducible, air-dry acrylic copolymer. The polymer has a unique mix of molecules with different molecular weights. Because of its unique structure, it allowed the replacement of all of the coalescent in the sanding-sealer with no-VOC resin solids. The sanding sealer is compatible with the no-VOC topcoat and stains. This formulation has good sandability, minimum wood yellowing, and good intercoat adhesion.

The zero-VOC stains are ultra-fine acrylic resin dispersions with surfactants, fungicides (exterior stain only), UV absorbers (exterior stain only), and zero-VOC pigment dispersions. The resin provides a solution-like appearance and penetration properties along with reduced grain rising. The new zero-VOC stains have the following features:

- Small Particle Size Emulsion - The ultra fine particle size allows for deep penetration into wood substrates with minimum grain raising.
- Excellent Film Formation Characteristics - Require no coalescing solvent.
- Good Color Development and Clarity - Stains show good color strength due to the inherent clarity of the polymer used.
- Easy to apply with good workability.
- Low odor.

The stains combine the best features of linseed oil and acrylic latex for superior color retention, adhesion, penetration and durability. The zero-VOC resin system used in stain does not form a traditional type of film, but instead permits the wood to breathe and release moisture which eliminates cracking, peeling and blistering, while providing resistance to weathering, chalking, and erosion.

All coatings were prepared in ADCO's laboratory and analyzed in an independent testing laboratory (APC Laboratory, Chino, California). Analysis by GC/MS confirmed that VOC contents were less than 10 g/l (VOC contents less than 50 g/l cannot be calculated accurately by the EPA Method 24 or AQMD Method 304). All comparative testing, except five specialized tests, were conducted at ADCO's warehouse, which is greatly impacted by external temperature, humidity and dust, simulating typical field application environments. Five specialized tests, which included mildew/fungus resistance, dirt pick-up, stain blocking, water repellence, and moisture vapor transmission were subcontracted to Calcoast Laboratory located in Emeryville, California. Calcoast laboratory specializes in conducting a variety of tests on coatings and is equipped to run ASTM, FM and other specialized tests.

Overall conclusions and recommendations based on testing and field demonstrations:

- The goal of the project was to develop and demonstrate zero-VOC or low-VOC coatings (varnish, lacquer, stains, waterproof sealers and sanding sealers) to further reduce VOC emissions in the South Basin. The target in developing the coatings was to achieve a performance level equal to, or better than similar coatings currently used by the industry. Laboratory analysis confirmed that these new coatings formulated for this project have VOC contents of less than 10 g/l (calculated from GC/MS analysis results).
- Most performance characteristics of this new zero-VOC wood coating system (including adhesion, beading, chemical resistance, coating penetration, dirt pick-up, dry time, mar resistance, moisture vapor transmission, stain blocking, print resistance, swelling, water uptake, and overall appearance) are equivalent to those of commercial coatings based on the side-by-side comparative testing results. Advantages of these no-VOC coatings include better grain raising for varnish, less color change (for lacquer, varnish, and sanding sealer), better moisture/UV resistance for exterior semitransparent stain, and better water repellent efficiency for waterproofing sealer. Although the dry time, freeze/thaw properties, pot life, mildew/fungus resistance, printing resistance, and stain blocking properties of some of these no-VOC waterborne coatings were slightly inferior to some of the solventborne coatings, the no-VOC coatings performed at an acceptable level for these performance characteristics.
- Three popular commercially available coating systems (both lacquer and varnish) were tested side-by-side with zero-VOC lacquer and varnish topcoat systems for repair and refinishing. This new zero-VOC varnish system showed the best overall appearance after repair, but had the highest coating usage because the two-component coating resulted in a limited pot life. The new zero-VOC lacquer system was the easiest to repair and showed the best gloss after repair.
- In order to obtain the impartial opinion of experienced painters on the performance of the new coatings, the painters of Commercial Casework, Inc. in Fremont, California conducted a field demonstration of the new coating system as part of this study. The personnel from Commercial Casework had never used the new formulations prior to this evaluation, but managed to quickly adapt to the slightly modified application method, and were impressed with the new wood coatings due to fast dry time, ease of use, and the safer working environment resulting from the absence of solvents. In the commercial environment, as opposed to ADCO's laboratory, the zero-VOC coatings dried faster than their solventborne counterparts.
- This new coating system unit price (cost per gallon) is lower than the unit price of the hybrid system, but higher than those of the solventborne coating systems on the market. However, once all other long-term cost savings are factored in (no emission fees, and no hazardous waste disposal fees), this new coating system price is more attractive. In addition, with the elimination of VOC emissions ceiling, productivity can be increased due to unlimited zero-VOC coating usage. Cumulative environmental impacts on this zero-VOC coating system are insignificant, and no significant project-specific cost impacts are anticipated.
- The development, demonstration and commercial use of zero-VOC coatings could potentially result in a VOC emission reduction from the control measures in the 1999 AQMP. According to the 1999 ARB survey of 1996 coatings, the VOC emissions from the categories covered by this project are over 5 tons per day in the South Coast Basin. If new coating systems, with VOC content of less than 50 g/l are successfully implemented, over

2.56 tons per day of further VOC emissions reduction from these new coating categories beyond potential reductions with future rule limits would be achieved. By using this new, promising zero-VOC waterborne coating technology, the anticipated air emissions reduction and health risk reduction could be achieved. Therefore, commercialization of the proposed technology will provide an alternative for compliance with current and future emission standards for coating operations imposed by federal, state, and local government agencies.

Some of the coatings developed under this project are now being manufactured and sold by Rustoleum Corp., a major national paint company, after additional testing indicated the high level of performance.

Case Studies (USEPA and Midwest Research Institute)

In cooperation with Midwest Research Institute, in May of 2000 the USEPA published a compilation of case studies (EPA-600/R-00-043) regarding the conversion of 25 wood furniture facilities to less polluting coating technologies including high-solids conversion varnishes, waterborne technologies, ultra-violet curable and powder coating. Because of the proposed VOC limits for clear wood finishes for (sealers and varnishes) and of future existing VOC limits for clear and pigmented lacquers, architectural wood coating operations will be limited in choice of higher solids (30-45 percent solids), exempt solventborne catalyzed topcoats, sealers and stains.

Flammability concerns of the exempt solvents of acetone and methyl acetate may limit the use of coatings formulated with such solvents. Ultra-violet curable and powder coating operations are simply not applicable to the realm of architectural wood finishing applications. It is the nonflammable waterborne acrylic and urethane finishes (stains, primers, sealers and topcoats) that wood product manufacturers have converted to that have applicability to Rule 1113. Out of the 25 conversions, 9 converted from high-VOC wood finishes to waterborne finishing systems. Several different reasons for converting to low HAP, low-VOC material are cited. Four apply to Rule 1113: (1) less hazardous materials; (2) a commitment to the environment; (3) a desire for a high-quality finish; and (4) a reduction in emissions.

The application of waterborne stains, sealers and topcoats, including lacquers, is different than solventborne ones and may give rise to difficulties. However with proper training all problems encountered by the facilities of the EPA report that switched to waterborne materials were minimized if not solved. For instance, waterborne coatings cannot be flooded-on as standard nitrocellulose products are; they need to be applied in thinner films to prevent coating softness and sagging. The EPA document states that grain raise issues were also minimized, and for some conversions, resulting sanding steps were the same as that used with high solvent coatings and stains, but needed to be done in a different order. Once proper drying and sanding has occurred, waterborne systems comprised of stains, sanding sealers, and varnishes or lacquers have harder films than standard one-component nitrocellulose lacquer systems, and may be tinted to achieve an amber look if desired.

Color matching was pointed out in the document as being more difficult with waterborne stains, however, with respect to Rule 1113 staff is not recommending lowering the VOC limit for high-solids stains (formulated both in solvent and in water at 250 grams VOC per liter, less water and less exempt compounds). Restrictions for stains purchased in small containers are not being recommended either, which will allow the use of high VOC low-solids stains for maximum depth of penetration and color uniformity. The EPA case study paper concludes that a close association with coatings manufacturers usually remedies waterborne stain problems satisfactorily, primarily with the addition and optimization of surfactants. Waterborne dye stains are also available which improve color uniformity.

Kitchen Cabinet Manufacturer's Association Standards

The Kitchen Cabinet Manufacturer's Association (KCMA) sets standards for the strength of cabinetry and the durability of applied coatings under the American National Standards Institute Approved ANS/KCMA A161.1-2000. In order to pass the KCMA test and carry the KCMA approval rating the coating is subject to the following:

- Finishes must withstand 120 degrees F at 70 percent relative humidity for 24 hours without showing appreciable discoloration and not showing evidence of blistering, checking, or other film failures.
- A similar hot and cold cycle (120 degrees F to room temperature and then to -5 degrees F) repeated five times without film failures.
- Exposure to vinegar, lemon, orange and grape juices, catsup, coffee, olive oil, and 100 proof liquor for 24 continuous hours and mustard for one hour, without showing discoloration, stains, or whitening (that will not be dispersed by ordinary polishing) and cannot blister, crack or show film failures of any kind.
- Cabinet door edge 24 hour submersion in soapy water without delaminating, or swelling, and no film failure.

There are several waterborne coatings, including stains, sanding sealers, varnishes, and lacquers that are already compliant with the proposed VOC limit of 275 g/l that pass the KCMA tests. Examples are: Aquapro, Aquadura and Superlaq, manufactured by SDA/Craft Technologies; and Waterborne Urethane Finish 255, and Multi-Purpose Ultraclear Urethane 275 manufactured by Fuhr International. SDA/Craft products that meet the KCMA standard are not only used in shop applications, but also in field applications.

AQMD Reports

Furthermore, the 2001, 2002, and Draft 2003 Annual Status Reports for Rule 1113, as well as the recently completed technology assessment for Rule 1136, clearly show a trend towards a greater number of products that comply with future limits for a broad range of coating categories, including those proposed for lower limits in the current proposal.

Technology Review of Coating Categories Selected for Amendment

The proposed revisions to Rule 1113 are comprehensive and involve the reduction of VOC content for several coating categories. These include clear wood finishes including sanding sealers and varnishes, roof coatings, stains, waterproofing sealers and waterproofing concrete/masonry sealers. Each of these coating categories is discussed below with regard to existing technology and applications.

Clear Wood Finishes

Clear wood finishes may be applied to various products consisting of, but not limited to, cabinets, doors, molding, paneling, windows, decks, benches, siding and floors (including bowling alleys). These coatings may also be applied to wood furniture, which is covered under Rule 1136. Furniture is not considered an appurtenance to stationary structures and therefore falls under the applicability of Rule 1136 – Wood Products Coatings. However, clear wood coating technology from wood furniture developed under Rule 1136 is directly transferable to Rule 1113 applications, with the exception of ultra violet curable and powder coatings, which are minimally used as architectural coatings. Manufacturers of wood coatings that supply products for shop-finishing have stated that contractors use their clear wood coatings both in touch-up and complete system applications in residential homes and office buildings. The biggest difference between shop and field application is that in field application there is no spray booth to exhaust the fumes and overspray. Waterborne coatings do not have the concentration of organic solvents to cause significant odor problems.

Low-VOC clear wood finishes are available today and can fundamentally be broken down into three types: (a) waterborne, (b) exempt solventborne, and (c) high-solids. Within these categories, several resin systems are available including acrylic, polyurethane, alkyd, and various copolymers or modifiers including but not limited to latex, polycarbonate, polyethylene, and urea. Many cure types are also available as one-component air-dried pre-catalyzed, and two-component post-catalyzed. Different cure types are necessary to assure proper durability for specific applications, whether they are for interior, exterior or for flooring use. Traditional varnishes and nitrocellulose topcoats will not likely meet a proposed limit of 275 grams of VOC per liter, less water and less exempt compounds, unless tertiary butyl acetate (TBAC) is de-listed as a VOC by USEPA and used as a substitute solvent. However, numerous manufacturers have developed clear wood finishes using alternative resin systems that perform as well as the solvent-based varnishes and nitrocellulose topcoats in terms of appearance and durability. These are discussed below:

(a) Waterborne

Waterborne coatings are available in several cure systems consisting of single-part non-catalyzed and pre-catalyzed (chemically reactive upon evaporation of the water or when exposed to air), and post-catalyzed plural-component reactive coatings including moisture curable urethanes, some with zero VOC.

The most common resin system in water is acrylic. A good waterborne acrylic will exhibit good to excellent clarity, good to excellent chemical resistance and a high degree of re-emulsifying capabilities when layered upon itself, or upon a coating compatible with an acrylic film. Acrylic coatings are self-sealing on wood substrates, however, wood sealers are also formulated with acrylic resins, should the preference be to seal and then topcoat. Due to wide variations in formulations, acrylic formulations range in VOC content from zero to about 275 grams per liter of coating (less water). Some coating manufacturers have formulated hybrid waterborne systems consisting of blends of acrylic with latex, polyurethane, epoxy, polyethylene and/or polycarbonate. The AQMD recognizes that coatings with resin modifiers are more expensive at the retail level. Typical volume solids content of these coatings, which include sanding sealers, vary from about 28 percent to 60 percent. Most waterborne acrylic formulations contain glycol ethers in small percentages (ethylene or propylene), which are two of the most commonly used co-solvents in waterborne coatings.

The second most popular resin system in water is polyurethane. These systems range in VOC content from zero to about 250 grams per liter, less water and are relatively high in solids (approximately 50 percent). Waterborne polyurethanes are fully reacted urethane polymers dispersed in water. Urethanes contain isocyanates as condensation reaction agents, in small percentages, that are mixed with a polyol. Some isocyanates present a health concern with exposure to the free monomer (e.g., TDI - toluene diisocyanate), whereas other commercially available isocyanates do not share this same level of health concern (e.g. methylene bisphenyl isocyanate - MDI). Typically, when a two-component coating containing isocyanates is mixed well and applied by brush or roller, there is no exposure to the monomer. When this mixed coating is atomized using a spray gun, there is a potential for exposure to the free monomer. The environmental assessment for Rule 1113 analyzed this issue in detail and concluded that there was no increased risk based on a risk assessment scenario established to demonstrate the overall insignificant risk. Waterborne polyurethanes are used for their superior performance characteristics, including hardness, chemical resistance, high elongation, UV resistance, low temperature flexibility, water resistance, abrasion resistance, and/or impact resistance. Waterborne polyurethanes are generally compatible with many other types of waterborne coatings such as acrylics and can be used as modifiers for blended resins, which further enhance film properties.

(b) Exempt Solvent-Borne

Although there are numerous exempt solvents available and in use for coating formulations, including methyl acetate, acetone, and para-chlorobromotriflouride, acetone is the preferred substitute exempt solvent of high-VOC compliant nitrocellulose resin systems that are still in wide use today, primarily due to the low cost of acetone when compared to other exempt solvents. The topcoats attained by these coating systems are easy to apply and redissolve each subsequent coat into the previous one. This forms a single high-build film that is clear, easily sanded, buffed and repaired. Reduction to 275 grams of VOC per liter, less exempt compounds on or before July 1, 2006, will likely reduce the use of acetone-based, co-solvent, single-component nitrocellulose topcoats, as well as most catalyzed nitrocellulose coatings and varnishes which offer the same appearance but with a harder film.

Currently, very few exempt acetone-containing clear coatings have extremely low VOC. Acetone-based catalyzed varnishes are available in the 200 grams of VOC per liter of coating range that are self-sealing and are comprised of alkyd-urea resin. Vinyl sealers are also in use with acetone that will meet the proposed VOC limit of 275 grams per liter.

Manufacturers are continuing to research formulations using other exempt solvents that can meet the proposed VOC limits. However, as the subsequent sections, as well as Appendix A, indicate that numerous compliant coatings with equal or superior performance are available for each category impacted with the current rule proposal.

(c) High-Solids

When compared to 18 percent solids of old formulations, almost anything would be considered high-solids, however for the purposes of this section, only materials with at least 75 percent solids will be considered. The only true candidate at this level of solids is polyester. Polyester finishes are necessarily high build coating systems with excellent grain filling properties. They are available and in use as self-sealing systems in clear and pigmented formulas. One drawback is that they contain the monomer styrene as a viscosity reducer, which is classified as a hazardous air pollutant and a VOC. Typical VOC contents range from 180-250 grams per liter.

Styrene has a low odor threshold and some find the odor objectionable. However, manufacturers of polyester finishes are working on reducing the styrene monomer content in these formulations.

Appendix A lists numerous clear wood coatings that meet the proposed limit. The following is a brief discussion of specific compliant products listed in Appendix A, highlighting key characteristics and testing data.

BonaKemi USA manufactures and sells the BonaTech MEGA® Brand Floor Finish that has a VOC of 250 g/l. This product is specifically designed for use on heavy-traffic interior residential and commercial wood flooring. The resin system used in this single-component product is polyurethane. Independent testing conducted by Colorado State University and the Taber Abraser testing indicate that the "MEGA® outperforms all other competitor's waterborne and oil-modified finishes." Although this product is initially more expensive than its solventborne counterparts based on their material cost, the manufacturer indicates that the expected life of the waterborne formulations is greater, and that the reduced dry time of waterborne, compliant products allows the user to complete more jobs in less time. Additionally, the consumer does not have to incur outside housing expenses, and businesses suffer less downtime while the work is being done. In conclusion, in terms of the overall coating cost analysis, the cost for using the waterborne coatings is less than for solventborne coatings.

Farwest Paint Manufacturing Co. manufactures and sells a Semi-Gloss Aquathane Waterborne Floor Finish comprised of a modified aliphatic urethane dispersion. The technical information indicates that the product is "primarily designed as a high abrasion resistant coating for hardwood floors; but is widely used for kitchen cabinets, coffee tables, fine wood furniture, table tops, clear wood trim varnish, etc." The solids content is greater than conventional nitrocellulose lacquers, making film build and aesthetics better than a conventional system. The VOC content is 186 g/l.

Fuhr International manufactures and sells the Multi-Purpose Ultra Clear Urethane, which is a waterborne self-sealing, self-cross linking, modified urethane finish. This product was originally designed for hardwood flooring, but has also been used on high-end furniture, passage doors, millwork, windows and cabinetry for both interior and exterior uses. The VOC content is 160 g/l and the product can be used in the field or in the shop. Fuhr International also manufactures a Waterborne Acrylic Varnish, a waterborne, self-sealing, self-cross linking finish, and is recommended for use on furniture, molding, passage doors, millwork, and wine racks. The VOC content is 73 g/l, and the product meets the KCMA finish coat testing requirements for the kitchen cabinet industry.

ICI/Dulux manufactures and sells the WOODPRIDE™ Interior Waterborne Aquacrylic Gloss Varnish with a VOC content of 191 g/l, comprised of a hybrid acrylic/urethane technology. The technical information indicates that this product "provides durable, transparent protection for interior wood surfaces such as cabinets, doors, woodwork, paneling, furniture and floors." The product is also resistant to abrasion, chipping, marring, water, oil, alcohol and blushing.

Roof Coatings

There are a variety of primers and coatings applied to bituminous, modified bituminous, roofing materials, as well as metal, polyvinyl chloride (PVC) and various synthetic rubber membranes, which include, but are not limited to ethylene-propylene terpolymer (EPDM), neoprene, chlorosulfonated polyethylene (CSPE, Hypalon), chlorinated polyethylene (CPE) and butadiene-acrylonitrile (nitrile rubber), polyisobutylene (PIB) and expanded polyurethane foam roofing, typically used for a variety of residential and commercial applications. The polymer type roofing materials are generally adhered together rather than coated and are not as widely used in the AQMD as bituminous/modified bituminous roofing. Other roof coatings can be applied to clay, concrete, wood shingles, and slate to extend their life. Many of these types of materials can be coated with waterproofing sealers described above.

Roof coatings are generally applied as a system, that is, as primers, base coats and reflective topcoats. Primers are usually applied to smooth and granule surfaced asphalt, modified bitumen, metal, and can be applied to polymer roofing materials such as CSPE, CPE, PVC, and urethane foams, prior to a base coat or reflective topcoat. Solventborne bituminous roof primers have a current VOC limit of 350 grams per liter of coating, These solventborne bituminous roof primers are useful in areas with imbedded dirt and dissolve roof contaminants and allow deep penetration into existing bituminous roofing materials. These bituminous roof primers provide a solid base to maximize the adhesion of the subsequent waterborne emulsion and elastomeric coats. For all other applications (non-bituminous roof primers) the applicable rule limit is 200 g/l. However, staff is not proposing to lower the VOC limit of the bituminous roof primers.

Base coats are used when covering bituminous and modified bituminous roofing materials. They have adhesive qualities and therefore can crossover into Rule 1168 – Adhesives and Sealants, when used in built-up roofs or as basecoats for gravel surfacing. Whenever a topcoat is applied to them, they serve as coatings and are regulated under Rule 1113. Asphalt and clay-stabilized emulsions comprise most base coats today. They are waterborne, extremely low in VOC, can contain polyester or fiberglass fibers and are extremely low in VOC (<50 grams per liter, less water). Other single component acrylic elastomeric coatings are available for use on metal, EPDM, PVC, foam, and Hypalon well below 50 grams of VOC per liter.

Reflective coatings are the last part of a coating system. Typically, these are categorized as aluminum emulsion roof coatings and "white" reflective coatings. High VOC aluminum coatings still exist today (450 – 500 grams per liter), however, waterborne aluminum paste reflective coatings are in use as well and are fast replacing the high VOC variety. It is the acrylic and ceramic/acrylic blends, which provide the highest solar reflectance between 70 percent and 85 percent and are manufactured with VOC contents below 60 grams per liter. The acrylic and ceramic/acrylic products are energy star rated.

Staff therefore concluded that a VOC limit of 50 grams per liter, less water, is feasible within the AQMD jurisdiction for reflective topcoats and asphaltic clay-stabilized base coats. Some manufacturers agreed with this conclusion, however they cautioned that low VOC roofing products might not be feasible in other areas where the climate is less favorable than typically found in the District.

The following are representative samples of base coats and topcoats that meet a VOC limit of 50 grams of VOC per liter, less water and less exempt compounds. All data is reflective of information obtained from technical and material safety data sheets.

Geocel 9500MB – Elastomeric Coating: This product is specifically for application to metal roofs and siding and is a blend of polymers and EPDM and forms a rubber membrane that is flexible, ultra violet (UV) light and mildew resistant, has 5 year durability limited warranty and may be brushed, rolled or spray applied. Application temperature is limited to 45 degrees Fahrenheit or warmer. The VOC content, less water is listed as 36 grams per liter.

United Coatings Roof Mate: An EPA Energy Star rated elastomeric 100 percent acrylic top coat for metal, built-up, modified bitumen, concrete, sprayed in place foam, Hypalon and EPDM, as well as composite shingle roofs. It forms a membrane that is highly reflective, flexible, breathable, chemical fallout and UV resistant. The product is available with 5, 10 and 15 year warranties and has a listed VOC content of 16 grams per liter, less water, and is sprayable.

Tropical Asphalt #360 Asphalt/Clay Emulsion Basecoat: A product designed as a basecoat for reflective topcoats and as a waterproofing coating. It is applications on built up roofing, metal, and masonry surfaces. A better bond occurs when roof surfaces are damp. Two coats are recommended with the use of a brush, roller or sprayer at application temperatures above 55 degrees Fahrenheit and should not be applied below this temperature. Material should not be applied to PVC, or to dry and brittle roofing materials. The VOC content is listed as 30 grams per liter.

In keeping with the 2005 California Building Energy Efficiency Standards, new construction low-emissive metallic roof coatings (i.e. aluminum) can be used if excess reflectivity can be proven (greater than 70% on low-sloped roofs). For additions, alterations, and repairs to existing low-sloped buildings, low-reflective coatings (30%) can be used. Aluminum reflective coatings may also qualify with the specifications set by the federal Energy Star program for steep-sloped roofs (initial reflectance of 25% and a reflectance of 15% after three years). Both programs help substantiate inclusion of these products into Rule 1113 as a separate category. Staff is recommending a VOC limit for aluminum reflective coatings at 100 grams per liter. An example of an aluminum reflective topcoat that complies with the 100 grams VOC per liter limitation, as taken from the technical data sheet follows:

> Tropical Asphalt #113 Hydro-Aluminum: A waterborne asphaltic emulsion containing highly polished aluminum flake pigment. Best if applied by spray or broom brush, to metal, smooth built-up-roof, mineral surface, emulsion, composition shingle and modified roof systems. It displays an initial reflectance of 55% and should be applied at a minimum of 55 degrees Fahrenheit.

Waterborne aluminum coatings could experience chemical reactions that produce hydrogen and the rate of reaction is accelerated when stored in a warm environment. Excessive pressure buildup and oxidation of the aluminum flake are minimized through an additive that slows the reaction down. United Coatings, a manufacturer of waterborne aluminum roof coatings, indicated that several drums of aluminum roof coatings have been in storage for three years without excessive pressure buildup problems. In addition, most waterborne aluminum roof coatings are purchased in bulk for immediate application by professional painting contractors, therefore storage is not a concern. The shelf life of waterborne aluminum roof coatings for residential use could be a concern because material kept for extended time periods may create pressure buildup in the container under improper storage conditions, such as a high ambient temperature. For the consumer market, manufacturers use containers equipped with pressure relief valves that mitigate the pressure buildup and minimize any concerns associated with hydrogen gas build-up by slowly releasing any hydrogen gas, if any.

Stains

There are three categories of stains existing in today's marketplace. Two fundamental types exist for exterior use, transparent stain (which includes clear and tinted systems) and opaque stain. Opaque stains completely hide wood grain but not its texture and have solids contents in a range between 25 and 40 percent. Most good exterior stains will weather away by sloughing rather than cracking, bubbling or peeling. Transparent stains are lower in solids (15-20 percent) and therefore form a barely visible coating film. Semi-transparent exterior stains do not need to be top coated with a clear finish; however, they usually require maintenance on an annual basis.

For interior use, there are essentially two types of stains that exist. They are dye stains, which penetrate so deeply into the wood surface that to remove them takes a great deal of sanding, and normal penetrating stains that are less penetrating than dye stains. Both stains will change the color of a wood species and/or enhance the grain without forming a coating film and require sealing and finish coating with a clear wood finish. Today's lower VOC technology has moved away from solventborne alkyd coating formulations to waterborne acrylic, acrylic latex and latex emulsions, gilsonite, and oil/alkyd/latex dispersions, achieving zero to 100 grams of VOC per liter of coating.

Interior waterborne acrylic low-solids stain bases can have VOC contents below 30 grams per liter of material (low-solids coatings definition applies). High-solids acrylic stain concentrates (greater than 1 pound of solids per gallon) in water can be as high as 225 grams of VOC per liter of coating depending on color (green, blue, red, and yellow). Dye stains are powders mixed in water and therefore contain no VOC.

Some acetone-based wood product coatings are available in low-VOC and in a range of coating types including but not limited to stain, toner, and glaze. High-solids stains, toners and glazes have been developed (and being used) at concentrations below 210 grams of VOC per liter of coating. Low-solids stains have also been created at less than 40 grams of VOC per liter of material. These coatings may fill the slight void left open by waterborne stains, which can be problematic with respect to color matching.

Since the formulation and application characteristics are completely different for interior and exterior stains, it is recommended to divide the category of stains into interior and exterior applications. Low-solids interior stains can be limited to 120 grams of VOC per liter of material (includes water and exempt compound dilution), whereas an interior stain can be limited to 250 grams of VOC per liter. All exterior stains are feasible at 100 grams of VOC per liter, less water and less exempt compounds. Exterior stains exist as acrylic, latex, modified acrylic and gilsonite resin systems at these levels. Although staff has evaluated the application of ultra-low VOC interior stains, based on comments from the industry regarding the need for higher VOC stains, it appears that the use of interior stains with a VOC content of 250 g/l mitigate the overall appearance and depth issues related to the use of low-VOC clear wood coatings. There is no concern about substituting the use of interior stains for exterior use because interior stains are not formulated with the same performance characteristics of an exterior stain. Interior stains are usually topcoated with a clear wood finish to provide protection whereas an exterior stain is formulated to provide color and protection. There is minimal air quality benefit from reducing interior stains to 100 g/l, calculated to be less than 0.02 tons per day.

Appendix A lists numerous stains for different applications that meet the proposed limit. The following is a brief discussion of specific compliant products listed in Appendix A, highlighting key characteristics and testing data.

Okon Co. manufactures and sells a product called DECK STAIN, which is a waterborne water repellent and wood stain for horizontal wood applications. This product has a VOC of approximately 100 g/l, and is designed for decks, milled, pressure-treated, and rough lumber. ASTM testing results show that this product performs equally or better than its higher-VOC counterparts. For example, this product passes the QUV 1,000 hour test for Ultraviolet light resistance, as well as ASTM D3359-90 for vapor transmission.

Columbia Paint & Coatings manufactures and sells the Woodtech Solid Color Pre-Stain (09-870), a low VOC (62 g/l) interior and exterior bare wood substrates. The technical information from the manufacturer indicates "excellent color retention, good penetration, and recoat properties." The company representative indicated that this product forms a hard film that is abrasion resistant and performs well for vertical and horizontal surfaces.

Epmar Corporation also manufacturers and sells a variety of low-VOC stains, including pigmented, clear, and semi-transparent. The Kemiko Transparent Stain is a single component product recommended for use on concrete, plaster, polymer cement, and wood. Applications include walkways, decks, hospitals, schools, shopping malls, restaurants, and theme parks. The VOC content is less than 30 g/l.

Fuhr International manufactures a Wiping Stain that has a VOC content of 15 g/l. This product is recommended for any wood surface and does not affect grain raising, and is available in an unlimited range of colors. The technical information from the manufacturer indicates good open time and workability for wiping applications. Fuhr International also manufactures a ZVOC® Exterior Waterbased Stain that provides "excellent substrate wetting and color control, overall durability, and chemical resistance, with minimal grain raising." This product has no VOCs.

Sherwin Williams manufactures and sells the Exterior Solid Color Acrylic Latex Stain – A16 Series under their ProMar® product line that has a VOC content of 97 g/l. This is a 100 percent acrylic product recommended for use on vertical wood, rough sawn lumber, textured or abraded plywood, siding shakes, and siding shingles.

Smiland Paint Company, a local manufacturer, manufactures and sells the Exterior Acrylic Solid Color Rustic Stain for use on exterior wood, masonry, concrete, stucco, properly primed metal and previously painted surfaces. The technical data indicates that this product provides "excellent protection for rustic wood surfaces such as rough sawn lumber, vertical shakes and shingles, fences, and masonite or hardwood siding." The VOC for this stain is 97 g/l.

Dunn-Edwards Corporation, a local company, manufactures and sells the ACRI-FLAT® product, which is listed as an Exterior Wood Stain and Masonry Flat Paint (W 704). The technical information from the manufacturer indicates that "ACRI-FLAT is extremely versatile and is ideally suited as a self-priming solid color stain for new or previously painted rough sawn wood." The VOC content of this product is 70 g/l.

The AVES Study also concluded that the zero-VOC exterior semi-transparent stains, typically used on vertical and horizontal surfaces performed better for some characteristics, including UV- and moisture-resistance, as well as dry-time, than the solventborne coatings.

The proposed implementation date for exterior stains was extended to July 1, 2007 based on comments received from Behr, Sherwin Williams, and National Paint and Coatings

Association (NPCA) regarding the time necessary for reformulation, performance testing, field testing, and exterior exposure work prior to introduction of new, compliant products. Although the requested implementation date varies by commentators, the current proposal attempts to balance the implementation date to allow for an adequate period of time to complete work necessary to ensure that products not only have adequate UV resistance, but also high abrasion resistance to ensure durability, since such products are typically applied to substrates exposed to exterior elements and heavy foot traffic.

Waterproofing Sealers Including Concrete/Masonry Sealers

Waterproofing sealers consist of two types in Rule 1113. (a) They are defined to be coatings that are formulated for the primary purpose of preventing water penetration into porous substrates. Wood and engineered wood products are primarily covered under this application and these sealers are currently limited to 250 grams of VOC per liter, less water and less exempt compounds. This does not exclude concrete and masonry sealers that do not meet all the performance criteria of waterproofing concrete/masonry sealers. (b) Concrete and masonry waterproofing sealers are defined to provide the same water resistance as the first category, but also protect the surface from inherent properties of concrete and masonry such as alkalinity and acidity reactions. In addition, they are formulated to resist ultraviolet (UV) light and must be tough enough to avoid staining. Concrete and masonry sealers are currently limited to 400 grams of VOC per liter, without water or exempt compounds. Both sealers exist as three fundamental types: (1) penetrating sealers (low solids, approximately 5 to 15 percent solids by weight), (2) film forming (15 to 30 percent solids by weight), and (3) high build coatings ranging from 45 to 100 percent solids.

Penetrating sealers do not form a visible continuous coating film and are usually formulated as silicone, silicates, or silane/siloxane waterborne micro emulsions with VOC contents less than 50 grams per liter, less water. The silicone variety fills the pores of the substrate, whereas the silane/siloxane variety react with concrete to form both a chemical and mechanical bond. One application is usually sufficient. If a second coat is called for, it should be applied after 24 hours. For successful application, the air and surface temperature must be at least 40 degrees Fahrenheit. There are a few penetrating waterborne low-solids acrylic sealers with less than 100 grams of VOC per liter as well. All of the penetrating type sealers are for above grade applications.

The silane/siloxane waterproofing concrete masonry sealers, especially the alkyl alkoxy silanes, are extensively used in highway projects by state departments of transportation (DOT's) throughout the U.S. Their main purpose is to prevent water, chloride ion, CO_2 and other chemicals' permeation to the steel structure under the poured concrete, thus protecting it. These coatings generally have to meet several tests, outlined in National Cooperative Highway Research Program (NCHRP) 244 and federal specification SS-W-110C, in order to be approved for use by the DOT's. According to CalTrans, which staff has contacted regarding these coatings, the only current requirement for approval is that the coating has to be a 40 percent silane/siloxane solution and it has to meet local air quality standards.

Current solventborne technology with a VOC limit of 400 g/l or less are usually comprised of a primer and topcoat or two coats of a sealer for proper application. Low-VOC film forming waterproofing sealers are typically acrylic and modified acrylic (urethane and epoxy copolymers for example) emulsions that are applied in two or more coats when air and surface temperature is a minimum of 50 degrees Fahrenheit and a maximum temperature of 90 to 100 degrees Fahrenheit. The first coat flows out and fills voids and the second coat develops a visible relatively continuous film which is said to be water resistant, UV light and abrasion resistant, and holds up to alkaline and acidic conditions that are above grade. Most acrylic and modified acrylic formulations have VOC contents below 250 grams per liter. Although staff has identified only a few of these formulations in the marketplace below 50 grams per liter, the technology does exist to support a VOC limit of 100 grams per liter, primarily as two component epoxy and moisture curable urethane products.

High build waterproofing sealers have applications for above and below grade situations. There are a variety of high build coatings below 100 grams of VOC per liter such as two-component epoxy, and single-component moisture-cured polyurethane for below grade hydrostatic and hydraulic pressure resistance. Other materials that are high build in nature are elastomeric, that is they withstand elongation. They form a rubberized membrane and are available in latex, acrylic, butyl rubber and asphaltic formulations. Most elastomeric sealers are less than 150 grams of VOC per liter and may involve the use of a primer before application. They can also be part of a system that incorporates imbedded fiberglass or be applied to expanded foam sheeting.

Appendix A lists numerous waterproofing sealers and waterproofing concrete/masonry sealers, both for above-grade and below-grade uses. The following is a brief discussion of specific products that comply with the proposed VOC limit of 100 g/l and are listed in Appendix A, highlighting key characteristics and testing data.

Davlin Coatings, Inc. manufactures and sells a waterproofing sealer (Acrylastic 490) that is marketed as a high-build, decorative, extremely flexible, high performance waterborne waterproof wall coating. It is recommended for use over cracked, uneven surfaces, especially where water penetration is a problem. The VOC content is 29 g/l, well below the proposed limit for waterproofing coatings. Testing, based on widely accepted ASTM methods, indicates excellent performance for tensile strength (ASTM D2370 – 2,400 1 in./min), moisture vapor transmission (ASTM E96, Proc. B – 1.2 perms), peel adhesion, concrete (ASTM D413 – 48 psi), alkali resistance (Fed. Spec TT-C-555B, GSA ex. 1 – no effect), and resistance to wind-driven rain > 100 mph (Fed. Spec. TT-C-555B – no weight gain). These results are equal or superior in terms of overall performance when compared to higher-VOC counterparts. Overall life of the coating is estimated to be double the performance of competitors.

Degussa AG, through its North American construction chemicals division ChemRex, manufactures and sells a concrete and masonry waterproofing sealer (Thorocoat DOT) that is marketed for US DOT applications. The product has a VOC content of 58 g/l and is a high-build film forming waterborne acrylic coating that can be applied on vertical or overhead new or aged concrete and previously coated surfaces. The product passes several DOT specific tests, such as accelerated weathering (ASTM G23 - 5,000 hours), wind-driven rain (Fed. Spec. TT-C-555B - pass), water vapor permeance (ASTM D1653 - 13 perms), salt spray resistance (ASTM B 117 - 300 hours), abrasion resistance (FTMS 141a - 3,000 +), impact resistance (FTMS 141a Method 6191 - 2.7 m/m), freeze-thaw resistance (FL DOT Section 400-15.2.6.7a - 50 cycles). All these characteristics are typical for the material applied in two coats at a dry film thickness of 16 mils. The product is delivered in DOT required colors.

Everest Coatings manufactures and sells EVERCOAT 7000S, High Modulus Waterproof Coating, a single component product that conceals irregularities, fills cracks, and provides excellent waterproofing on a variety of masonry substrates. This coating utilizes acrylic resin technology supplied by Rohm and Haas, and has a VOC of 69 g/l, with a percent solids volume of 60 percent. This product exhibits excellent resistance to the elements and U.V. degradation, has alkali-resistant pigments, and is mildew resistant. The recommended uses include aged, new and previously painted above-grade masonry, concrete, concrete block, and stucco.

GE Sealants & Adhesives, manufactures and sells VIP1550 CONCENTRATED WATER REPELLANT (VIP1550), which is a high performance, breathable, clear, water repellant sealer that penetrates deeply into concrete and masonry surfaces without altering the natural appearance of the substrate. This product contains silanes/siloxanes and is recommended for use on concrete driveways, walkways, brick paver and patio deck steps, as well as vertical masonry surfaces including stone, tilt-up concrete, brick, clay tile, and block. The VOC content is 0.5 g/l, and the product provides excellent water repellency to reduce cracking, spalling, freeze/thaw damage, chemical degradation, biological growth, efflorescence and dirt pickup.

L&M Construction Chemicals, Inc. manufactures Aquapel & Aquapel Plus, a micro-emulsion, silane/siloxane water repellant bonds directly with the substrate, resulting in very good resistance to moisture and salt, and has a VOC of less than 50 g/l. This product is recommended for use on buildings, parking decks, monuments, garages, driveways, dams, piers or any other concrete surfaces. Technical data from the manufacturer indicates that reduced water adsorption by 85 percent and chloride intrusion by up to 90 percent. Both products exceed NCHRP 244, Series II requirements for salt and water penetration.

Rainguard International Products Company, a local manufacturer, manufactures and sells Blok-Lok®, a clear water repellant with a VOC content of 37 g/l that is comprised of polysilanes. This product is recommended for use on masonry block, concrete, stucco, cement plaster, and other composite construction materials. Testing based on ASTM procedures conducted by the manufacturer shows that the product equal or superior performance to its higher VOC counterparts. For example, ASTM E-514-86, Wind Driven Rain tests indicate that the use of Blok-Lok® reduces leak by 98.7 percent, reduced chloride ion intrusion (NCHRP No. 244), and allows 100 percent water vapor transmission (ASTM D-1653).

Sherwin Williams manufactures ConFlex XL, a textured high-build acrylic elastomeric coating recommended for concrete tilt-up, precast, poured-in-place concrete, CMU, and stucco. The technical information indicates “excellent flexibility, durability, and weather resistance”. This pigmented waterproofing sealer has a VOC of 94 g/l. Testing done for or by Sherwin Williams, using ASTM methods, indicate elongation of 300 percent based on ASTM-D412. This coating also passes low temperature flexibility and freeze-thaw resistance tests, based on ASTM D522 and ASTM D2243, respectively.

Smiland Paint Company, under their Morwear Label, manufactures and sells a Clear Elastomeric Waterproofing Sealer (2571-70) recommended for application new or old, above grade, dense or porous concrete, stucco, and masonry surfaces. The VOC is reported to be 30 g/l, and the technical material from the manufacturer indicates that this product is suitable for damp or dry surfaces, is breathable and permeable to water vapor, and can be applied over substrates previously treated with silanes, siloxanes, urethanes, and acrylic paints. The technical data also indicates that this waterproofing sealer has “excellent elongation (440 percent), excellent tensile strength (400 psi), excellent exterior durability, and excellent water resistance.” These conclusions were based on results from ASTM testing done for the above performance characteristics. Smiland Paint Company also makes and sells an interior/exterior heavy duty waterproofing (2555-70), which is an emulsion of polysiloxane resins, exhibiting a durable and invisible shield against water penetration. This product is recommended for use on "interior or exterior above-grade concrete, masonry, cement blocks, brick, stucco, stones, porous tile, exposed aggregate concrete, sandstone, and slate." The VOC content of this product is 2 g/l. Waterproofing sealers for use below grade, that are less than 100 grams per liter of VOC are Thoroseal® cement-based waterproof coating for concrete and masonry and Epmar Tru-Kote 1120 High Solids Epoxy (above- and below-grade for walls and floors).

Sierra Corporation/TK Products manufactures and sells a WB Silane Concentrate Concrete Sealer (TK-1311) that has a VOC of 59 g/l. This product is a micro emulsion based on silane and oligomeric alkoxysilanes mixed with water, and testing conducted by Wacker Silicones Corporation using the NCHRP 244 test procedures, indicates that chloride and moisture intrusion is reduced by more than 80 percent.

B. SITE ASSESSMENTS

Coatings Evaluation and Availability

An important point of concern for industrial, commercial and consumer applicators of architectural painting products are coating characteristics and availability of low and zero-VOC materials as mandated by current and future limitations in Rule 1113. During past rule development efforts, staff has committed resources to specifically addressing those concerns and with respect to the currently proposed reductions of VOCs from the specific architectural coatings categories listed, has continued the previous standard of continually surveying, analyzing and reviewing information relative to these and all other categories.

Prior reports submitted to the Governing Board regarding architectural coatings include coating technology assessments and product availability studies that indicated the availability of compliant coatings in the specific categories studied, many of which are the focus of this rule amendment. Previous studies have shown and new information continues to support staff's position that low-and zero-VOC coatings are as good and in many instances better performing products than their higher VOC counterparts.

Surveys and Site Evaluations

Clear Wood Finishes

Clear wood finishes as defined in Rule 1113 includes coatings that are applied to wood substrates to provide a solid film. AQMD staff has conducted an extensive review of product data sheets and has determined that there are many coating manufacturers offering a variety of clear wood finish products that are well below the proposed 275 g/l limit. Appendix A of this staff report lists nearly 40 products that are currently available, over half of which are well below 200 g/l of VOCs. As part of ongoing rule development efforts and technical assessment of various coating categories, staff has conducted site visits to locations where low- and zero- VOC clear wood finishes have been applied.

Specific examples include a line of zero-VOC products manufactured by Silvertown Products. This particular manufacturer has a product line that includes five transparent exterior finishes, seven semi-transparent exterior finishes and seven opaque products that are sold throughout North America. Staff have visited the manufacturing plant and reviewed the various products that have been applied and continually are being subjected to outdoor exposure at the facility. Additionally, staff has obtained samples and applied them to benches at the AQMD for outdoor exposure that includes a zero-VOC clear wood finish (Rhinoguard Deck and Siding Finish). Staff that have applied the coatings have commented on the ease of application and have stated that the coating appears to be holding up very well to the elements. The president of the company has stated that his products are replacements for varnishes. He also said that Federal Parks and the Department of Forest Services specify his Rhinoguard products for applications based on durability and appearance.

Staff has conducted visits to facilities that have applied other zero-VOC products including Park Water Company, where JFB Hart Coatings are used extensively for all substrates. Park Water Company has been using JFB Hart Coatings for over seven years and applies both clear and pigmented zero-VOC finishes to wood, steel, concrete, roof and canvas substrates. The clear finishes applied to wood and other substrates include JFB Hart's HP-105 Clear, a two component zero-VOC coating. Painters working for the main coatings applicator for Park Water Company, Specialty Industrial Coatings Corporation, have stated that the coatings are easy to apply, durable and retain their gloss very well.

Other site visits of clear wood finishes that have been applied and meet the proposed limit of 275 g/l includes Barneys of New York in Beverly Hills where BonaKemi products were applied. The BonaTech MEGA Satin floor finish was applied to fourth and fifth wood floors at the Barneys of New York site. The contractor applying the less than 250 g/l VOC product stated that he uses the clear coating on most of the commercial and residential jobs he does and says he is a big fan of the product and it is real durable. He estimated that Barneys of New York would not need a maintenance coat for approximately five years.

Another line of low-and zero-VOC products manufactured by Fuhr International is currently being marketed in Southern California for use on wood substrates. Staff had an opportunity to visit a small cabinet manufacturing company in Mira Loma called Kitchen Idea that applies Fuhr's 355 Acrylic Varnish (75 g/l VOC) to their finished products. The facility representative stated that they apply the clear finish in their paint spray booth and often times do touch up in the field after installation of the cabinets is complete. He is very pleased with the quality of the product.

In addition to the many site visits for clear wood finishes, District staff has reviewed the Technology Assessment for Rule 1136 – Wood Products Coatings completed earlier this year. The results of the technical assessment and the industrial progress reports required under Rule 1136 indicate that the technology exists and is in use today in the form of many resin and solvent systems that are less than 275 g/l of VOCs for application to wood substrates. The significant number of large and small companies that conduct a variety of wood finishing operations that meet the proposed 275 g/l VOC limit for clear wood finishes in Rule 1113 are a strong indication of the feasibility of these low VOC products. Based on discussions with manufacturers who supply products for shop- and field-finishing, staff believes that the products in use in the manufacturing wood products industry (Rule 1136) that are well below 275 g/l VOC can readily be used in field applications (Rule 1113). The biggest difference between shop and field application is that in field application there is no spray booth to exhaust the fumes and overspray. Waterborne coatings do not have the concentration of organic solvents to cause significant odor problems.

Roof Coatings

The proposed roof coatings category limit of 50 g/l has well over 40 products that are available for application to various roof substrates. On July 31, 2003, Rule 1113 staff met with the Union Roofing Contractors Association and several roof coating manufacturers at AQMD Headquarters. The meeting was held for the purpose of: a) discussion of the AQMD proposed changes to the VOC limit of roof coatings and b) to better inform staff about roof coatings. Six roof coating manufacturers were invited to the meeting and five attended.

The initial discussion involved agreement on what roofing products were subject to Rule 1168 and Rule 1113. After agreement on roof coatings subject to Rule 1113, the subject of aluminum and white reflective roof coatings was discussed. Aluminum reflective coatings have been reformulated from 400 g/l to approximately 100 g/l to meet the current limit of 250 g/l. Some of the manufacturers said that the aluminum reflective coatings are not necessary. White reflective coatings can be formulated at 50 g/l or less and are more reflective. One manufacturer said that CFR Title 24 is mandating high reflectivity coatings that aluminum formulations cannot meet, essentially eliminating these coatings by 2005.

Some manufacturers said that low VOC roof coatings work fine in the climatic conditions of the SCAB and would not pose an application problem if the manufacturers' recommendations were followed. However, industry was in agreement that in other parts of the United States using these products could be a problem due to adverse climatic conditions.

The meeting concluded with all parties in agreement that the proposed 50 g/l VOC limit for roof coatings if implemented by 2005, would be feasible and not pose any problems for the manufacturers.

Stains

The stain category as defined in the rule includes various substrates and as such, staff continues to review wood and concrete stains as part of the rule development efforts. Often times the same facilities that apply clear wood finishes using low- and zero-VOC coatings also utilize similar ultra compliant products for the staining of the substrates prior to application of a clear coat. This is the case with several site visits by staff including the previously mentioned visit to Kitchen Idea. During the manufacture of the wood cabinets, a zero-VOC stain manufactured by Fuhr International (ZVOC Universal Stain 155) is applied prior to the clear topcoat.

A review of the data completed from the progress reports for Rule 1136 indicates the use of stains that easily meet the proposed limit of 100 g/l VOC in Rule 1113. Staff has researched and witnessed the application of the existing low-VOC wood coating technologies and has determined that they are indeed feasible for an extremely wide range of wood coating operations that can be readily carried over to field applications.

Staff has obtained stain samples from Silvertown Products that was previously mentioned, and have applied them to benches located at the AQMD prior to application of the zero-VOC clear topcoat. The zero-VOC stain manufactured by Silvertown Products used in the bench exposure study is called Rhinoguard Wood Defense Deck and Siding Finish, Honey.

Although staff has evaluated the application of ultra-low VOC interior stains, based on comments from the industry regarding the need for higher VOC stains, it appears that the use of interior stains with a VOC content of 250 g/l mitigate the overall appearance and depth issues related to the use of low-VOC clear wood coatings. There is no concern about substituting the use of interior stains for exterior use because interior stains are not formulated with the same performance characteristics of an exterior stain. Interior stains are usually topcoated with a clear wood finish to provide protection whereas an exterior stain is formulated to provide color and protection. There is minimal air quality benefit from reducing interior stains to 100 g/l, calculated to be less than 0.02 tons per day.

Waterproofing Sealers & Waterproofing Concrete/Masonry Sealers

The coating category of Water Proofing Sealers and Water Proofing Concrete/Masonry Sealers has an expansive list of low- and zero-VOC products that are already available and have been shown to have desirable performance characteristics such as durability, abrasion resistance and appearance. Staff has had the opportunity to visit field locations and paint manufacturing facilities where those types of coatings have been applied and in use for many years.

EPMAR Corporation, a subsidiary of Quaker Chemical Company, manufactures epoxies and polyurethanes with numerous applications. Staff has visited many sites where various clear coats had been or were in the process of being applied, including their Kemiko Acrylic Urethane (<50 g/l VOC), Sta-Crete 3700 Clear Epoxy (<100 g/l VOC) and Sta-Crete 2700 (0 VOC) product lines. Locations where these coatings have been applied and are in use today include the Newport Beach Marriot, the Palm Desert Shopping Mall, Temecula Auto Repair & Radiator, Inc., the Regency Wilshire, Kneedler-Fauchere Studio at the Pacific Design Center, Hope University in Fullerton, the Fairplex at the Los Angeles County Fairgrounds, the Saint Regis Hotel in Dana Point and Atherton Baptist Homes in Alhambra. Facility representatives were pleased with the results and many commented on the nice look, durability and good resistance to UV light of the finishes. The various contractors and applicators commented on coating characteristics such as the ease of application, excellent coverage and quick dry time.

Other products in this category include a line of coatings manufactured by Rain Guard that include low-VOC waterproofing concrete/masonry sealers consisting of both topical and penetrating sealers. This company specializes in penetrating sealers with a VOC content of 37 g/l. The penetrating sealers move into the substrate anywhere from one-eighth to one-quarter of an inch and are not as exposed to the environment, therefore protecting the substrate much longer. After application and drying there is no color change to the substrate. Staff had an opportunity to visit several locations where the penetrating sealers and topical clear coats had been applied from a few months ago to as long as seven years ago. Staff also saw a rock and concrete barrier wall on Jamboree Road in Newport Beach that had received an application of this penetrant 7 years ago. The penetrating sealer was Rain Guard's Clear Water Repellent (37 g/l VOC) followed by a clear top coat of the VandlGuard (87 g/l VOC) anti-graffiti coating. Another location visited by staff included a sound attenuation block wall on Freeway 73 that had an application of Rain Guard's penetrant (Blok-Lok Clear Water Repellent, 37 g/l VOC) and anti-graffiti coating (VandlGuard anti-graffiti coating, 87 g/l VOC). The overall appearance of the coated substrate was still good and appeared to provide a protective film.

As previously mentioned, a site visit to Park Water Company by staff was conducted to see first hand the use of a two component zero-VOC product manufactured by JFB Coatings. The clear finish (JFB's HP-105 Clear) applied to the many concrete and masonry structures throughout Park Water Company facilities in Los Angeles County have proven to be well suited for the water resistant characteristics required by the company.

Allowances in Rule for Exceeding Current and Future VOC Limitations

The AQMD, working extensively with members of the architectural coatings industry and other stakeholders developed and incorporated an alternative compliance option into Rule 1113, the Averaging Compliance Option (ACO). The purpose of the ACO is to promote compliance flexibility and improved cost efficiency. In the November 8, 1996 amendments to Rule 1113, an ACO was included for the Flats category with subsequent amendments on May 14, 1999 to streamline its implementation and add numerous categories to provide additional compliance flexibility with the future limits. There are currently seven manufacturers that are utilizing this option.

Additionally, there is an allowance in the rule for the sale or application of a coating manufactured prior to the effective date of the corresponding standard in the Table of Standards for up to three years after the effective date of the standard. This sell-through provision applies to all coatings listed in the Table of Standards and any effective dates applicable to the specific coating.

Staff continues to assemble a growing list of compliant and supercompliant coatings that are being used in many different applications and settings. Furthermore, the additional technology assessments required by Rule 1113 for certain coating categories have generally verified that they are performing to expectations. Staff is committed to continuing to work with interested parties toward future technology coating assessments.

C. OTHER TECHNOLOGIES

Staff has evaluated other techniques and alternatives to reducing VOC emissions other than lowering the VOC content of the coatings. The following appears to be the most feasible approach.

Transfer Efficiency

Staff currently is and will continue to assess transfer efficiency (TE) during the spray application of architectural coatings as a viable means of reducing VOC emissions. TE is the amount of material applied to the object being painted compared to the amount of material sprayed. Rule 1113 does not have a TE requirement written in the rule because there are a number of factors involved in determining TE such as: size and geometry of the object being coated, equipment setup and maintenance and spray technician technique such as gun-to-target distance, overlapping successive spray gun passes, lead and lag triggering times, and speed of spray gun travel.

Staff contacted the Iowa Waste Reduction Center (IWRC) about their Spray Technique Analysis and Research (STAR®) program and set up a demonstration of the program at the Los Angeles Trade & Technical College. Staff contacted the Painters International Union and asked them to participate in the STAR® demonstration. One of their field investigators volunteered to go through the training program. STAR® training begins with an analysis of the spray technician's spraying technique through video footage. Overspray, the amount of paint used, VOC emissions and TE are calculated to compare with post-training results. STAR® trainers then introduce alternative spray techniques and equipment, such as the Laser Touch® targeting device and high-volume low-pressure (HVLP) spray guns. The Laser Touch® targeting device can be attached to most types of spray guns. Two laser beams project from the Laser Touch® to the target painting surface. The laser beams are then adjusted to form a single dot when the spray gun is at the correct preset distance from the object being coated. If the spray gun moves too close, too far or is not held at the correct angle to the surface being sprayed, the beams separate. The single dot can be used to target the spray pattern on the object that results in an accurate 50 percent overlap. Technicians are then given the opportunity to experiment with the equipment and improve their spray technique. After a final spraying session, overspray, VOC emissions and TE are then recalculated and compared to pre-training results. The STAR® program has proven that spray technicians can increase their TE by more than 25 percent through increased attention to advanced application techniques. Benefits of the STAR® program also include reduced material consumption and cost; reduced overspray and emissions; reduced health risks; and improved finish quality. Most of the STAR® training has been for shop application such as automotive coatings. Staff intends to continue working to determine if a TE requirement can be implemented for architectural application. The training program could be beneficial to all spray technicians. Working in conjunction with CARB and IWRC the Painters International Union is in the process of becoming a STAR® training center.

CARB evaluated the air quality-related performance of this technology and verified that when using Laser Touch Model LT-B512 with an Accuspray Model 19 high volume low pressure paint spray gun, in accordance with the Laser Touch manufacturer's instructions, the volume of a single-stage polyurethane enamel application was decreased by an average of 15 percent and therefore a corresponding volatile organic compound emissions reduction of an average 15 percent can be assumed. The USEPA, through the Environmental Technology Verification Program (EVT), also evaluated the Laser Touch® model LT-B512 targeting device for manual spray-painting operations. The test was designed to verify that the Laser Touch® model LT-B512 can provide an environmental benefit over unassisted manual spray application systems while maintaining or improving the finish quality of the applied coating. The test results verified the test design and the data showed that the Laser Touch® model LT-B512 results in an average relative increase in TE of 11.1 percent over the unassisted spray application.

Staff has determined that this alternative approach needs to be further developed and will continue to develop this method, especially in terms of calculating verifiable emission reductions.

Eliminating Rule Exemptions

Staff reviewed the exemptions in Rule 1113 to determine whether the quart exemption was necessary because of coating technology. Staff concluded that, for clear wood finishes, including lacquers, eliminating the exemption for quart containers or less was feasible based on the technology assessment that indicates that adequate substitute products with low-VOC contents are available and in use today. Staff also concluded that this change had the potential for significant emission reductions. The conclusion was based on the sales data shown in Table 1 below for several clear wood finishes, showing a relatively high percentage being sold in quart containers or less. Also, the 2001 Survey data shows a relatively large percentage of those coatings sold in quart containers or less exceed current VOC limits. The volume of varnishes sold in quarts, for example, can be as high as 97 percent. Since the proposed VOC limit of 275 g/l for clear wood finishes allows the use of a number of low-VOC technologies, an exemption for sales in small containers for this coating category is no longer warranted. Appendix A, as well as the AVES Study and the Annual Status Report for Rule 1113, indicate that clear wood coatings that comply with the proposed VOC limit of 275 g/l are available and in use today, in all container sizes, including container sizes one quart or less. Staff has proposed two versions of the rule amendments, one eliminates the exemption for clear wood finishes in July 2006 and one in July 2008. Version 1, the staff proposal eliminates the small container exemption for clear wood finishes, effective July 1, 2006. Version 2 of the Proposed Amended Rule includes a two year extension of the small container exemption for clear wood coatings, with maximum VOC limit of 450 g/l for varnishes and 550 g/l lacquers. This proposed extension is based on requests from industry, including Behr, Sherwin Williams, and NPCA to provide a transition period for industry to introduce lower-VOC products, while allowing for the availability of small volumes of higher VOC products necessary for touch-up and repair, as well as address formulation compatibility issues that may occur for a period of time. Although the requested implementation date varies by commentators, the current proposal attempts to balance the implementation date to allow for an adequate transition period. Staff continues to evaluate the rule exemptions, including the small container exemption for other categories and may propose further amendments in the future.

Table III-1 shows California sales volume in gallons, of quart containers or smaller for the coating categories proposed for VOC emission reductions and the percent sold in quart containers or less.

Table III-1 – California Small Container Sales[1]

Coating Category	Total 2000 Sales in > quarts	Total 2000 Sales in quarts or <	% Small Containers
Clear Wood Finishes			
Varnish – Clear	662,630	425,230	39.1%
Varnish - Semitransparent	1,784	59,721	97.1%
Roof Coatings	1,134,869	2,485	0.2%
Bituminous Roof Coatings	3,239,994	5,403	0.2%
Sanding Sealers	16,098	12,170	43.1%
Stains			
Clear/Semitransparent	1,732,923	438,673	20.2%
Opaque	1,079,339	8,034	0.7%
Waterproofing Sealers	1,006,632	10,979	1.1%
Waterproofing Concrete/Masonry Sealers	700,028	7,893	1.1%

[1] – From 2001 CARB Survey

However, based on concerns about a necessary transition period needed to phase out the solventborne, higher-VOC products, manufacturers indicated that an additional two year period is needed for touch-up and repair uses of existing coated substrates. Staff is continuing to evaluate the need for this transition time and recognizes that the ACO could allow the continued sale of higher-VOC formulations for limited volume needed for touch-up and repair uses.

Solvents used for Cleanup of Architectural Coatings

The thinning of architectural coatings is allowed in Rule 1113 as long as the manufacturer's recommendations for solvent-borne coatings is on the container and those recommendations do not cause a coating to exceed its applicable VOC limit in the Table of Standards.

The VOC content of solvents used in the cleaning of application equipment for architectural coatings is regulated under Rule 1171 – Solvent Cleaning Operations. Currently Rule 1171 states that clean-up solvent for application equipment is exempt from the rule requirements as long as the solvent does not exceed 950 grams of VOC per liter. The AQMD Board, in November 2003, adopted an amendment that removes this exemption from Rule 1171 – Solvent Cleaning Operations effective July 1, 2005.

C H A P T E R IV

EMISSION INVENTORY

A. CALIFORNIA AIR RESOURCES BOARD SURVEYS

CARB gathers air quality data for the state of California, ensures the quality of this data, designs and implements air models, and sets ambient air quality standards for the state. CARB compiles the state's emissions inventory and performs air quality and emissions inventory special studies. CARB uses the Emissions Inventory and Air Quality Models to evaluate air quality and reduce emissions in each of the 35 local air districts.

CARB has conducted architectural coating surveys every four or five years with previous surveys conducted in 1976, 1981, 1985, 1989, 1993, and 1998. The purpose of the surveys is to gather current information on the VOC content and sales volume of architectural coatings. CARB is currently evaluating the data on architectural coatings sold in California, collected with the latest survey for sales in 2000. It is titled 2001 Architectural Survey Draft Report. The report is available on CARBs website at:

http://www.arb.ca.gov/coatings/arch/survey/2001/survey.htm.

The surveys are used in the development of regulations or rules throughout California to reduce the VOC emissions from these products. CARB has provided technical assistance to the air pollution control districts in the form of industry surveys and research. To track the emission contributions of architectural coatings, an inventory was created that is based on the surveys. CARB has also provided regulatory and policy guidance through the development of a SCM for architectural coatings, which was first adopted in 1977, and subsequently amended in 1985, 1989, and 2000.

The 2001 Survey listed all architectural coatings into 51 coating categories. These 51 categories are integrated by definition into the 42 coating categories in the Rule 1113 Table of Standards. The 2001 Survey identified more than 98 million gallons of architectural coatings sold in California in 2000, with 83 percent of that volume coming from waterborne products and 17 percent from solventborne products. Emissions from these coatings are approximately 40,000 tons of VOC per year or about 110 tons per day as an annual average. Although waterborne products represented 83 percent of the volume, they only contributed 41 percent of these emissions, while the solventborne products representing 17 percent of the volume sold contributed 59 percent. If emissions from solventborne thinning and cleanup products are included (assumed to be one pint per gallon of solvent-borne coating and zero for waterborne coatings), the average annual emissions are approximately 128 tons per day, with 35 percent of the emissions contributed by waterborne products and 65 percent coming from solvent-borne products. Information on VOC content was also collected for all 51 coating categories. Coating sales in the AQMD are estimated based on population and represent 45 percent of those sold statewide. It is assumed that the distribution of waterborne and solventborne coatings is consistent throughout the state.

Values for VOC content summarized in the 2001 Survey were determined by calculating the sales-weighted average. The VOC content values appear as VOC Actual (A-VOC) and VOC Regulatory (R-VOC). A-VOC, also know as Material VOC, is a ratio of the weight of volatile organic compounds per a given volume of coating. A-VOC is the value used exclusively to determine the emission inventory. R-VOC is a ratio of the weight of VOCs per a given volume of coating with water and exempt VOCs subtracted from both the numerator (weight) and denominator (volume) and is what appears as the VOC limit in all coating rules. The original rational behind the R-VOC value was to reflect the relationship of coverage to total solids content and to provide an equivalent basis for comparing the polluting portion of solventborne and waterborne coatings. Also, it was believed that the R-VOC approach would prohibit coating manufacturers from simply diluting a coating with water in order to meet standards specified in coating regulations.

Under a Confidentiality Agreement, AQMD has obtained the detailed data submitted by manufacturers to CARB for compilation. The AQMD has signed a confidentiality agreement with CARB agreeing to comply with the provisions of the California Public Records Act (California Government Code Section 6250 et Seq.), and specifically with Government Code Section 6254.5(a), regarding the disclosure of confidential data provided by architectural coating manufacturers in the 2001 Architectural Coatings Survey, which was submitted to CARB under a claim of confidentiality. The AQMD also agreed that, as set forth in California Government Code Section 6254.5(e), the above-referenced information shall only be used for purposes that are consistent with existing law. Both the emission inventory and the emission reductions are calculated from data provided in the 2001 Survey. However, the emissions inventory is calculated from total sales volume for all container sizes, whereas emission reduction calculations are based on an adjusted emission inventory calculated using an adjusted sales volume omitting quart containers or less, since they are exempt from the current provisions of Rule 1113 and for containers greater than quarts at or below the current VOC limit. The additional processing of the 2001 Survey data yields numbers that may not be available from the published Summary.

B. EMISSION INVENTORY

Table IV-1 – Emission Inventory for Selected Coating Categories from the 2001 Survey

Coating Category	CA 2000 Sales (gal)	CA Emissions (TPY)	AQMD 2000 Sales (gal)	AQMD Emissions (TPY) (45%)	AQMD Emissions (TPD)
Clear Wood Finishes[1]	664,414	627	298,986	282	0.77
Clear Wood Finish Quarts[2]	517,291	989	232,780	445	1.22
Sanding Sealers[3]	16,098	24	7,244	11	0.03
Roof Coatings[4]	4,382,751	1,789	1,972,238	805	2.20
Stains	3,258,968	3,373	1,466,536	1,518	4.15
Waterproofing Sealers[5]	1,725,532	1,173	776,489	528	1.44
Totals	10,570,977	7975	4,756,940	3,589	9.8

[1] Includes Data for Varnishes, Excludes Quart Containers or Less
[2] Includes Lacquer, Sanding Sealer and Varnish
[3] Data does not Include Lacquer Sanding Sealers, Excludes Quart Containers or Less
[4] Includes Bituminous Roof Coatings
[5] Includes Waterproofing Concrete/Masonry Sealers

C. ADJUSTED EMISSION INVENTORY FOR CALCULATING EMISSION REDUCTIONS

The emission inventory is calculated by multiplying the sales volume by the sales weighted average actual-VOC content. Staff adjusted the baseline inventory to account for sales of: (a) coatings below the proposed VOC limit which were excluded from the inventory, since these coatings are already compliant; (b) coatings above the current AQMD VOC limits were assumed to be at the current compliance limit, and (c) small exempt containers. This establishes an adjusted emission inventory from which the emission reductions are calculated for the proposed amendments. The detailed emission inventory calculation may be found in Appendix B. Table IV-2 summarizes the adjusted emissions inventory for the AQMD based on the elements previously stated, and with the assumption that 45 percent of the state sales are within the SCAB.

Table IV-2 – AQMD Adjusted 2000 Emission Inventory

Coating Category	CA Adjusted Sales (gal)	CA Adjusted Emissions TPY	AQMD Adjusted Emissions TPY (45%)	AQMD Adjusted Total in TPD
Clear Wood Finishes[1]	436,105	509	229	0.63
Clear Wood Finish Quarts[2]	509,200	988	445	1.22
Sanding Sealers[3]	11,767	7.1	3.2	0.01
Roof Coatings[4]	2,082,396	1,586	714	1.95
Stains, Exterior	2,440,391	756	340	0.93
Waterproofing Sealers[5]	829,643	637	270	0.79
Totals[6]	6,309,502	4,483	2,017	5.53

[1] Includes Data for Varnishes, Excludes Quart Containers or Less
[2] Includes Lacquer, Sanding Sealer and Varnish
[3] Data does not Include Lacquer Sanding Sealers, Excludes Quart Containers or Less
[4] Includes Bituminous Roof Coatings
[5] Includes Waterproofing Concrete/Masonry Sealers
[6] Numbers in the table are calculated in an excel spreadsheet and the totals may not add correctly because of decimal places and rounding

CHAPTER V

EMISSION REDUCTIONS

The detailed calculations for the coating category sales volume, emission inventories and emission reductions are in Appendix B. Please refer to Chapter IV – Emission Inventory for the discussion on A-VOC versus R-VOC.

The following Sections A through C are written descriptions and examples of how the emission reduction methodology was used by staff for waterborne (WB) clear wood finishes (varnish). The same methodology is also used for the other coating categories, both waterborne and solventborne, which are added together to determine the total VOC emission inventory and emission reduction. Since quart containers or less are exempt from the rule, their sales volumes have not been included for emission reduction calculations except for clear wood finishes. Since staff is proposing to eliminate the quart container or less exemption for clear wood finishes including lacquers, sanding sealers, and varnishes the emissions from sales in these containers were calculated separately.

A. SALES VOLUME FOR WATERBORNE VARNISHES

The 2001 Survey sales were divided into two groups: a) sales above the current VOC limit in Rule 1113 and b) sales between the proposed and current VOC limits. This establishes different sales weighted averages (SWA) for the VOC content and volume fractions used to adjust or project sales. If the CA SWA R-VOC is greater than the current VOC limit in Rule 1113, staff adjusted the sales volume assuming these products were at the current compliance limit for the AQMD. When the VOC content is reduced, it is replaced by water or exempt compounds and this typically lowers the solids content, reflecting a greater volume of coating but usually an overall emission reduction.

<u>CA 2000 Sales Volume Greater than (>) 350 grams per liter (g/l)</u>

1. WB clear wood finishes sales = 58,209 gallons.
2. SWA VOC

   A-VOC = 228/ g/l

   R-VOC = 433 g/l
3. SWA Volume Fractions

   Volume Fraction VOC = 0.23

   Volume Fraction Water or Exempt Solvent 0.48

   Volume Fraction Solids = 0.29

<u>CA Adjusted Sales Volume at AQMD Current R-VOC Limit</u>

1. Current VOC limit

   R-VOC = 350 g/l

   A-VOC = 127 g/l Average of products sold at or near R-VOC of 350 g/l
2. Calculate volume fractions

   Volume fraction of VOC = 127 / 880 = 0.14

   Volume fraction water or exempt compounds = 1 - (127 / 350) = 0.64

   Therefore:

   Volume fraction of solids = 1 - 0.64 - 0.14 = 0.22

3. An adjusted sales volume is established based on the volume fraction of solids (vfs) for 2000 sales divided by the volume fraction of solids at the current VOC limit and then multiplied by the 2000 sales for that coating category.

   Adjusted Sales Volume = $0.29^{\text{vfs}} / 0.22^{\text{vfs}} * 58{,}209^{\text{2000 sales}}$ = 77,243 gallons

CA Projected Sales Volume at The Proposed VOC Limit

1. The proposed R-VOC limit is established through technology assessment and data from the Survey. The Survey is also used to determine the A-VOC. From these values, an adjusted volume fraction of VOC, water or exempt compounds and the solids are determined for the proposed R-VOC limit.

   Proposed R-VOC = 275 g/l

   Calculated A-VOC = 110 g/l

2. Calculate volume fraction

   Volume fraction of VOC = 110 / 880 = 0.13

   Volume fraction water or exempt compounds = 1 - (110 / 275) = 0.60

   Therefore:

   Volume fraction of solids = 1 - 0.6 - 0.125 = 0.28

3. Projected Sales Volume is established based on the volume fraction of solids (vfs) for adjusted sales divided by the volume fraction of solids at the current VOC limit and then multiplied by the adjusted sales for that coating category.

   Projected Sales Volume = $0.22^{\text{vfs}} / 0.28^{\text{vfs}} * 77{,}243^{\text{adjusted sales}}$ = 61,384 gallons

CA 2000 Sales Volume Between 275 and 350 (g/l)

The same methodology is used for this sales volume with the following results:

CA Sales = 53,005 gallons

No adjustment to this sales volume is required because the SWA R-VOC is 299 g/l, which is less than the current VOC limit of 350 g/l.

Therefore:

Projected sales = 52,041 gallons.

B. EMISSION INVENTORY FOR WATERBORNE VARNISHES

CA 2000 Emission Inventory (EI) for CA 2000 Sales > 350 grams per liter (g/l)

Calculate the EI by multiplying the 2000 sales volume by the SWA A-VOC content in g/l and that value is converted into pounds per gallon (lb/g) and then tons per year (tpy).

Therefore the 2000 EI is:

$$\text{2000 EI} = \frac{58{,}209^{\text{gal}} * 228^{\text{g/l}} * 3.785^{\text{lb/gal}} / 453.6^{\text{g/lb}}}{2000^{\text{lb/ton}}} = 55 \text{ tpy}$$

CA Adjusted Emission Inventory (EI) for CA Adjusted Sales at Current R-VOC Limit of 350 g/l.

Calculate the EI by multiplying the adjusted sales volume by the calculated A-VOC content in g/l and that value is converted into lb/g and then tpy. This establishes an adjusted EI for the current VOC limit for that category.

Therefore the adjusted emission inventory is:

$$\text{Adjusted EI} = \frac{77{,}243^{\text{ gal}} * 127^{\text{ g/l}} * 3.785^{\text{ lb/gal}} / 453.6^{\text{ g/lb}}}{2{,}000^{\text{ lb/ton}}} = 41 \text{ tpy}$$

CA Projected Emission Inventory (EI) for CA Projected Sales at Proposed VOC limit of 275 g/l

Calculate the projected EI by multiplying the projected sales volume by the calculated A-VOC content in g/l and that value is converted into lb/g and then tpy. This establishes a projected EI for the proposed VOC limit for that category.

Therefore the projected emission inventory is:

$$\text{Projected EI} = \frac{61{,}384^{\text{ gal}} * 110^{\text{ g/l}} * 3.785^{\text{ lb/gal}} / 453.6^{\text{ g/lb}}}{2{,}000^{\text{ lb/ton}}} = 28 \text{ tpy}$$

CA Emission Inventory for CA 2000 Sales Between 275 and 350 (g/l)

The same methodology is used for to derive the emission inventory for these sales with the following results:

CA Emission Inventory = 29 tpy

No adjustment to this inventory is required because the SWA R-VOC is 299 g/l, which is less than the current VOC limit of 350 g/l.

Therefore:

Projected Inventory = 24 tpy

C. EMISSION REDUCTION FOR WATERBORNE VARNISHES

CA Emission Reduction (ER) for CA 2000 Sales > 350 grams per liter (g/l)

The projected EI is subtracted from the adjusted EI to establish the CA ER for these sales.

Therefore the CA ER is:

CA ER = 41 tpy $^{\text{adjusted inventory}}$ – 28 tpy $^{\text{projected inventory}}$ = 12.76 tpy

CA Emission Reduction (ER) for CA 2000 Sales Between 275 and 350 (g/l)

The projected EI is subtracted from the CA sales with no adjustment to establish the CA ER for these sales.

Therefore the CA ER is:

CA ER = 29.41 tpy $^{\text{CA sales}}$ – 23.88 tpy $^{\text{projected inventory}}$ = 5.53 tpy

AQMD Total WB Emission Reduction (ER)

Although the 2000 US Census shows the population of all of Los Angeles, Orange, Riverside and San Bernardino Counties at 46 percent of the California population, staff used a factor of 45 percent to discount the portions of the counties not within AQMD jurisdiction.

Therefore, for waterborne clear wood finishes, the AQMD ER associated with the proposed 275 g/l VOC limit is:

ER = 18.29 tpy * 0.45 = 8.23 tpy or 0.02 tpd

D. EMISSION REDUCTION FOR COATING CATEGORIES PROPOSED FOR AMENDMENT

The proposed amendments will result in emission reductions from the following coating categories and achieve an overall emission reduction of 3.73 tons per day. Table V-1 summarizes the AQMD emission reductions for both waterborne and solvent-borne coatings from these categories using the above methodology.

Table V-1 – Summary of AQMD Emission Reductions

Coating Category	Proposed VOC Limit (g/l)	Emission Reductions (tpd)
Clear Wood Finishes[1]	275	0.21
Clear Wood Finish Quarts[2]	275	0.83
Sanding Sealers[3]	275	0.003
Roof Coatings[4]	50	1.59
Stains, Exterior	100	0.56
Waterproofing sealers[5]	100	0.52
Total		3.73

[1] Includes Data for Varnishes.
[2] Includes Lacquer, Sanding Sealer and Varnish.
[3] Data does not Include Lacquer Sanding Sealers.
[4] Includes Bituminous Roof Coatings.
[5] Includes Waterproofing Concrete/Masonry Sealers.

C H A P T E R VI

COST AND COST-EFFECTIVENESS

A. COST-EFFECTIVENESS

The data compiled in Appendix A, which summarizes technical data of the many products already being manufactured and sold in today's consumer market for the categories proposed for amendment clearly demonstrate that the proposed VOC limits are not technology forcing, but technically feasible and cost-effective. In order to obtain relevant pricing to determine cost-effectiveness of the proposed amendments, staff contacted architectural coating manufacturers to obtain the cost per gallon for products that comply with the current VOC limit, as well as the proposed VOC limit. Table VI-1 shows the cost-effectiveness based on the average cost per gallon obtained from the manufacturers and listed in Appendix A. However, after repeated requests by staff, the industry has not provided any specific cost information to staff pertaining to reformulation and testing.

Staff has also analyzed alternative cost scenarios in an effort to quantify worst-case cost scenarios that can serve as sensitivity analyses. In one alternative cost scenario summarized in Table VI-2, staff calculated the future cost for compliance, assuming there will be a 10 percent increase in the current average cost per gallon of coating sold. This estimated increase at the retail level incorporates any increased cost of raw materials, reformulation, testing, and repackaging a new product prior to commercialization. In the second alternative cost scenario summarized in Table VI-3, staff calculated the future cost of compliance by assuming there will be a 10 percent increase in the current average cost per gallon of coating sold for clear wood finishes, roof coatings, stains and a 20 percent increase for waterproofing sealers including concrete/masonry sealers. The rationale was that reformulation of this category may involve more complex resin technologies, such as epoxy- and urethane-based formulations, instead of acrylics. The cost differentials are based on the assumption that some architectural coating manufacturers may need to reformulate existing coatings, primarily by using currently-available, technologically-innovative resins, as well as utilizing the growing list of exempt solvents.

All sales volumes are reflected as adjusted 2001 Survey values based on current AQMD VOC limits. Furthermore, these adjusted volumes are translated into future gallons as a ratio between the solids content of the current adjusted inventory and the future solids content. This cost is then multiplied by the number of gallons sold.

The annual cost increase for the tables is derived as the difference between the projected cost of future coatings and the cost of the current coatings. Since the emission inventory is stated in terms of daily emissions or tpd, the emission reduction for all the coating categories is converted to a yearly figure by multiplying by 365 operating days per year. The cost-effectiveness in dollars per ton is calculated by dividing the annual cost increase by emission reductions in tons per year (tpy) and is represented by the following equation. Each table itemizes these costs.

$$\textit{Cost-Effectiveness} = \frac{\textit{Annual Cost Increase}}{\textit{Emission Reductions in (tpy)}}$$

Table VI-1 – Cost Based on the Current Sales Price

Coating Categories with Proposed VOC Limit	Current Costs			Future Costs		
	Average Cost Per Gallon[1]	AQMD 2000 Sales Volume[2] (Gal)	Dollars	Average Cost Per Gallon[3]	AQMD Projected Sales Volume[4] (Gal)	Dollars
Clear Wood Finishes (Includes Sanding Sealers, Varnish) 275 g/l	$30.67	430,683	13,209,265	$30.58	643,476	19,676,685
Roof Coatings 50 g/l	$20.21	937,078	18,936,628	$16.75	928,522	15,548,764
Exterior Stains 100 g/l	$21.94	1,098,176	24,098,165	$23.17	912,456	21,145,363
Waterproofing Sealers (Includes concrete/masonry Sealers) 100 g/l	$23.67	373,339	8,837,986	$25.31	571,727	14,470,972
Totals		2,839,276	65,082,044		3,056,182	70,841,783

1 Average cost per gallon for products with prices listed in Appendix A.
2 AQMD adjusted 2000 sales volume based on current VOC limit per Appendix B.
3 Average cost per gallon for products with prices listed in Appendix A, at or below the proposed VOC limit.
4 AQMD projected sales volume based on the proposed VOC limit per Appendix B.

Annual Cost Increase = $70,841,783 - $65,082,044 = $5,759,739
Emission Reductions = 3.73 tpd * 365 days per year = 1,362 tpy

$$\textbf{Cost-Effectiveness} = \frac{\$5{,}759{,}739}{1{,}362\text{ tpy}} = \textbf{\$4,229 per ton VOC reduced}$$

Table VI-2 – Cost Based on the Current Sales Price Plus 10 Percent Increase

Coating Categories with Proposed VOC Limit	Current Costs			Future Costs		
	Average Cost Per Gallon[1]	AQMD 2000 Sales Volume[2] (Gal)	Dollars	Average Cost Per Gallon[3]	AQMD Projected Sales Volume[4] (Gal)	Dollars
Clear Wood Finishes (Includes Sanding Sealers, Varnish) 275 g/l	$30.67	430,683	13,209,265	$33.74	643,476	21,709,307
Roof Coatings 50 g/l	$20.21	937,078	18,936,628	$22.23	928,522	20,640,100
Exterior Stains 100 g/l	$21.94	1,098,176	24,098,165	$24.14	912,456	22,025,037
Waterproofing Sealers (Includes concrete/masonry Sealers) 100 g/l	$23.67	373,339	8,837,986	$26.04	571,727	14,887,854
Totals		2,839,276	65,082,044		3,056,182	79,262,298

1 Average cost per gallon for products with prices listed in Appendix A.
2 AQMD adjusted 2000 sales volume based on current VOC limit per Appendix B.
3 Average cost per gallon with an increase of 10%.
4 AQMD projected sales volume based on the proposed VOC limit per Appendix B.

Annual Cost Increase = $79,262,298 - $65,082,044 = $14,180,253
Emission Reductions = 3.73 tpd * 365 days per year = 1,362 tpy

$$\textbf{Cost-Effectiveness} = \frac{\$14{,}180{,}253}{1{,}362\text{ tpy}} = \textbf{\$10,411 per ton VOC reduced}$$

Table VI-3 – Cost Based on the Current Sales Price Plus 10/20 Percent Increase

Coating Categories with Proposed VOC Limit	Current Costs			Future Costs		
	Average Cost Per Gallon[1]	AQMD 2000 Sales Volume[2] (Gal)	Dollars	Average Cost Per Gallon[3]	AQMD Projected Sales Volume[4] (Gal)	Dollars
Clear Wood Finishes (Includes Sanding Sealers, Varnish) 275 g/l	$30.67	430,683	13,209,265	$33.74	643,476	21,709,307
Roof Coatings 50 g/l	$20.21	937,078	18,936,628	$22.23	928,522	20,640,100
Exterior Stains 100 g/l	$21.94	1,098,176	24,098,165	$24.14	912,456	22,025,037
Waterproofing Sealers (Includes concrete/masonry Sealers) 100 g/l	$23.67	373,339	8,837,986	$28.41	571,727	16,241,295
Totals		2,839,276	65,082,044		3,056,182	80,615,739

1 Average cost per gallon for products with prices listed in Appendix A.
2 AQMD adjusted 2000 sales volume based on current VOC limit per Appendix B.
3 Average cost per gallon with an increase of 10% for Clear Wood Finishes, Roof Coatings, Stains and 20% for Waterproofing Sealers.
4 AQMD projected sales volume based on the proposed VOC limit per Appendix B.

Annual Cost Increase = $80,615,739 - $65,082,044 = $15,533,695
Emission Reductions = 3.73 tpd * 365 days per year = 1,362 tpy

$$\textbf{Cost-Effectiveness} = \frac{\$15{,}533{,}695}{1{,}362 \text{ tpy}} = \textbf{\$11,405 per ton VOC reduced}$$

B. INCREMENTAL COST

Health and Safety Code Section 40920.6 requires an incremental cost-effectiveness analysis for a proposed regulation to at least one other control option that would achieve the emission reduction objective. Incremental cost-effectiveness is defined as the difference between the costs of two potential control options, divided by the difference in emission reductions between those control options.

Compliance with the proposed amendments to Rule 1113 is achieved through the use of reformulation of coatings with possibly the averaging of lower-VOC products with higher VOC products. Since only this single control option exists for architectural coatings, it is not possible to calculate incremental cost-effectiveness for different control options for the proposed amendments to Rule 1113. Nevertheless, to provide additional information, staff has provided the incremental cost-effectiveness value for a more stringent proposal (lower VOC limits for each category, except roof coatings). Assuming additional VOC reductions of 0.72 tons per day from more stringent VOC limits for clear wood finishes, stains and waterproofing sealers including concrete/masonry sealers, the incremental cost-effectiveness is estimated at $62,850 per ton. Staff estimated an increase in the average cost per gallon of 20 percent for clear wood finishes and stains, as well as 30 percent for waterproofing sealers at the retail level that would reflect increased costs of raw materials, reformulation, testing, and repackaging a new product prior to commercialization. The estimated cost is increased because the resin technology to comply with this more stringent proposal is limited to costlier, more complex systems, including epoxy and urethane technology.

Table VI-4 – Cost Based on Alternative Proposal

Coating Categories with Alternative Proposed VOC Limits	Current Cost			Future Cost for Alternative Proposed VOC Limits		
	Average Cost Per Gallon[1]	AQMD 2000 Sales Volume[2] (Gal)	Dollars	Average Cost Per Gallon[3]	AQMD Projected Sales Volume[4] (Gal)	Dollars
Clear Wood Finishes (Includes Sanding Sealers, Varnish) 100 g/l	$30.67	430,683	13,209,265	$36.80	658,660	24,241,722
Roof Coatings 50 g/l	$20.21	937,078	18,936,628	$20.21	928,522	18,763,727
Stains 50 g/l	$21.94	1,098,176	24,098,165	$26.33	1,386,785	36,517,615
Waterproofing Sealers 50 g/l	$23.67	373,339	8,837,986	$30.77	570,583	17,559,499
Totals		2,839,276	65,082,044		3,544,550	97,082,563

1 Average cost per gallon for products with prices listed in Appendix A.
2 AQMD adjusted 2000 sales volume based on current VOC limit per Appendix B.
3 Average cost per gallon with no increase for roof coatings, 20% increase for Clear Wood Finishes and Stains, and 30% increase for waterproofing sealers.
4 AQMD projected sales volume based on the alternative proposed VOC limit.

Annual Cost Increase = $97,082,563 - $65,082,044 = $32,000,519
Emission Reductions = 4.45 tpd * 365 days per year = 1,624 tpy

$$\textbf{Cost-Effectiveness} = \frac{\textbf{\$32,000,519}}{\textbf{1,624 tpy}} = \textbf{\$19,705 per ton VOC reduced}$$

Incremental Cost-Effectiveness Formula

$$\text{Incremental Cost-Effectiveness (\$/ton of VOC reduced)} = \frac{\text{Annual Cost Increase of Alternative (\$)} - \text{Annual Cost Increase of Proposal (\$)}}{\text{Emission Reduction of Alternative Proposal(tpy)} - \text{Emission Reduction of Proposal (tpy)}}$$

$$\textbf{Incremental Cost-Effectiveness} = \frac{\textbf{\$32,000,519} - \textbf{\$15,533,695}}{\textbf{1,624 tpy} - \textbf{1,362 tpy}} = \textbf{\$62,850 per ton of VOC reduced}$$

C H A P T E R VII

DRAFT FINDINGS

DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE

Health and Safety Code Section 40727 requires that prior to adopting, amending or repealing a rule or regulation, the AQMD Governing Board shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the hearing. The draft findings are as follows:

Necessity - The AQMD Governing Board has determined that a need exists to amend Rule 1113 - Architectural Coatings*,* to achieve VOC emission reductions to meet the federal and state ambient air quality standard for ozone and to clarify rule language.

Authority - The AQMD Governing Board obtains its authority to adopt, amend, or repeal rules and regulations from Health and Safety Code Sections 39002, 40000, 40001, 40440, 40702, and 41508.

Clarity - The AQMD Governing Board has determined that the proposed amendments to Rule 1113 - Architectural Coatings*,* are written and displayed so that the meaning can be easily understood by persons directly affected by them.

Consistency - The AQMD Governing Board has determined that Proposed Amended Rule 1113 - Architectural Coatings*,* is in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, federal or state regulations.

Non-Duplication - The AQMD Governing Board has determined that the proposed amendments to Rule 1113*,* do not impose the same requirement as any existing state or federal regulation, and the proposed amendments are necessary and proper to execute the powers and duties granted to, and imposed upon, the AQMD.

Reference - In adopting these amendments, the AQMD Governing Board references the following statutes which the AQMD hereby implements, interprets or makes specific: Health and Safety Code Sections 40001 (rules to achieve ambient air quality standards), 40440(a) (rules to carry out the Air Quality Management Plan), and 40440(c) (cost-effectiveness), 40725 through 40728 and Federal Clean Air Act Sections 171 et sq., 181 et seq., and 116.

C H A P T E R VIII

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Coating Company, Product Name, Components	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal) @3mils	Recommended substrate/ exposure	Coating Characteristics	Drying time to recoat	Cost per Gallon (dollars)
Clear							
Products with a VOC Content between the Current and Proposed Limits (250 g/l to 101 g/l)							
Rainguard, Micro-Seal Clear Water Repellent	284	100	55-120	Dense masonry, cast concrete, porous surfaces	High performance water repellent, resistant to high alkalinity, not effected by UV light or weathering, 6-8 hour pot life	1 hour to touch full cure 48-72 hours	
Prosoco, HydroSeal 20	256	20	125-250	Parking & Concrete structures	N/A	24 hours	
Hill Brothers, Desert Brand DB Total Sealer	250	N/A	125-175	Tiles, masonry, concrete surfaces	Deep penetrating, spalling, cracking, discoloration and efflorescence resistant	2-3 hrs	
Rainguard, American 700 Clear Masonry Deck Sealer	236	N/A	100	Decks, resurfaced concrete, cementitious surfaces, or other non-resilient substrates	Slip resistant, excellent adhesion, weather resistant, fast drying	2 hours	
Prosoco, Concrete ScienceWaterPel	211	4	N/A	Concrete, stucco & most masonry surfaces	Long lasting, water repellent, alkali resistant	N/A	
Prosoco, Weather Seal GP, General Purpose Water Repellent	211	4	50-175	Concrete, fired clay, marble, travertine, limestone, granite, sandstone, slate	Long lasting water repellent,UV, alkali resistant, penetrant	1 hr. touch	
L & M, Hydroblock	195	15	50-100	Concrete Block	Non-yellowing, mildew resistant, good water repellent	2 hours	29.60 (148 for 5 gal)
L & M, Hydropel WB	195	8	100-250	Vertical concrete masonry units	Long lasting, water repellent, non-yellowing	2 hours	17.80 (89 for 5 gal)
Prosoco, Concrete Science Silox 10	194	7	N/A	Concrete & masonry	Long lasting, water repellent, alkali resistant	1 hr. touch 24 hrs cure	
Okon, Plugger Water Repellent Sealer OK-950	146	N/A	N/A	Verticle surfaces only, Concrete block, masonry, stucco	UV, water resistant, non-flammable	N/A	15.72
Sierra Corp (TK Products), TK-290 WB Tri-Siloxane	140	20	50-250	Concrete, stucco, parking structures, bridge decks	Excellent penetration, UV, alkali, industrial fumes and water resistant	N/A	23.00
Okon, W-1 Water Repellent Sealer OK-910	134	N/A	N/A	Brick-glazed, concrete, granite, limestone, plaster, stucco	Water, household chemicals resistant, non-flammable	N/A	12.67
Prosoco, Concrete Science Water Pel Natural Stone	129	5	N/A	Stone & masonry surfaces	Long lasting, water repellent	4-6 hrs	
Okon, W-2 Water Repellent Sealer OK-920	119	N/A	N/A	Adobe block, brick, concrete, stucco	Water, household chemicals resistant, non-flammable	N/A	15.72

Waterproofing Concrete/Masonry Sealers

Coating Company, Product Name, Components	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal) @3mils	Recommended substrate/ exposure	Coating Characteristics	Drying time to recoat	Cost per Gallon (dollars)
Sherwin Williams, H & C Concrete & Masonry Waterproofing Sealer	114	10	100-250	Concrete, brick, masonry, cinder block, flagstone, canvas, stucco	Efflorescence, spalling, salt and water resistant,	15 min. touch 2-4 hrs recoat	13.99
Products with a VOC Content at the Proposed Limit and Below							
Karnak, LL10, LL20	40-80	N/A	125-175	Facades, pre-cast concrete, roadways, stucco, brick, terra-cotta	Water repellent, good penetration, prevents spalling, chloride ion	7-10 days cure	
Degussa/ChemRex, Thoroglaze	75	N/A	100-300	Concrete, concrete aggregate panels, stucco, vertical surfaces, interior/exterior	Durable, non-yellowing, breathable, semi-gloss finish	N/A	
Farwest, X-5645 Aqueous Concrete Sealer	62	23	117-352	Concrete Floors	Excellent weathering, chemical, alkali, water resistance	1 hr touch	18.44
Sierra Corp (TK Products), TK-1311 WB Silane Concentrate	59	N/A	150	Concrete	Water repellent	N/A	150.00
L & M, Aquapel & Aquapel Plus (20% and 40% silane/siloxane)	50	N/A	150-200	All concrete surfaces, brick pavers, aggregate	Highly resistant to moisture, salt, good penetration, breathable	N/A	30.00 (150 for 5 gal)
All Pro, All-Seal Waterproofing Sealer	47	14	100-250	Masonry, stucco, roof, brick, stone, adobe, drywall, plaster, etc	Highly penetrating, UV, alkali resistant	1 hr touch 4-6 hrs recoat	
Rainguard, Regular Clear Water Repellent	40	8	45-120	Masonry, concrete, stucco, EFIS, composite	Water repellent, UV, chloride resistant, prevents spalling and cracking	1 hour to touch 1 day to recoat	13.00
Rainguard, Super Clear Water Repellent	40	8	45-150	Masonry, concrete, stucco, EFIS, composite	Water repellent, UV, chloride resistant, prevents spalling and cracking	1 hour to touch 1 day to recoat	
Rainguard, Blok-Lok Clear Water Repellent	37	12	55-120	Masonry, concrete, stucco, EFIS, clay, adobe	Superior water repellency, UV , chloride resistant	1 hour to touch 1 day to recoat	14.25
Smiland (Morwear), Elastomeric Waterproofing, Clear 2571-70	30	N/A	80-200	Concrete, wood & masonry	Excellent elongation, durability,, water resistance	1-2 hrs touch	13.75 (68.75 for 5 gal)
United Coatings, Canyon Tone Clear Transparent W/B Sealer	29	10	100-250	Concrete, masonry	UV stable, deep penetrating, chloride, spalling, water resistant, non-yellowing	15 minutes 1 hr. cure	13.00

Waterproofing Concrete/Masonry Sealers

Coating Company, Product Name, Components	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal) @3mils	Recommended substrate/ exposure	Coating Characteristics	Drying time to recoat	Cost per Gallon (dollars)
Seal-Krete, High Solids Waterproofing Sealer	15	25	80-300	Verticle surfaces only, Stone, brick, adobe, wood, plaster limestone, coral, drywall	Waterproofing, excellent adhesion, non-yellowing, breathable	1-2 hours	27.99 (139.95 for 5 gal)
Seal-Krete, Waterproofing Sealer	8	10	50-300	Stucco, concrete, brick, roof tile, wood, siding, metal, adobe	Non-yellowing , good adhesion and penetration	1-2 hours	11.69
Smiland (Morwear), Int/Ext Heavy Duty Waterproofing 2555-70	2	N/A	50-200	Concrete, masonry, brick, stucco, stones, porous tile sandstone, slate	UV protectant, stops spalling and dusting, good adhesion, highly water repellent	72 hours	13.75 (68.75 for 5 gal)
GE Sealants & Adhesives, VIP1550 Concentrated Water Repellent	1	47	125-450	Concrete driveways, walkways, brick paver, patio deck steps, and vertical masonry surfaces including natural and synthetic stone, tilt up concrete, brick, clay tile, stucco and block	UV resistant, excellent water repellency, resistant to cracking, blistering, alkali, spalling, chloride ion	12-14 hours for foot traffic 7 day cure	49.00
Life Paint Company, #1325 Micro-Life Concrete Masonry Sealer	1	6	100-150	Concrete, masonry blocks, stucco	Fast drying, penetrating	Fast drying	12.99
BEHR, No. 980 Concrete & Masonry Waterproofer	0	N/A	250	Block, pavement, stucco, brick, unglazed tile, concrete, slate	Excellent penetration, resists spalling, efflorescence, mildew	24-48 hrs	23.97
Degussa/ChemRex, Thoroclear Special	0	N/A	200-300	Interior/exterior, vertical/horizontal concrete, aged limestone	Penetrates, seals, water repellent, breathable	N/A	
L & M, Seal Hard	0	N/A	200	Concrete floors	Abrasion resistant, non-yellowing, chip and peel resistant, odorless	2-4 hours	24.00 (120 for 5 gal)
Prosoco, ToughCoat PS	0	18	200-600	Concrete surfaces	Resistant to chemicals, oil, gas, & rubber marking	4-5 days	
Samuel Cabot, Waterproofing With Teflon Surface Protector 1000	0	6	100-250	Wood, masonry, concrete, brick, stone & unglazed tile	Washable, water, oil and grease repellent, mildew resistant	3 hrs touch 24 hours recoat	19.77
Sherwin Williams, H & C WB-50 Water Based Water Repellent	0	3	N/A	Concrete, concrete block, bricks, tiles, plaster	Flexible, durable, inhibits mold and mildew growth	1-4 hrs touch	22.99
Pigmented							
Products with a VOC Content between the Current and Proposed Limits (250 g/l to 101 g/l)							
Benjamin Moore, 100% Acrylic Elastomeric Waterproof Coating Flat 056, White	250	39	80-100	For uncoated or new masonry and previously painted surfaces such as smooth stucco, concrete/cinder block, fiber cement siding, pre-cast concrete, poured in place concrete, and tilt-up construction	Resistant to wind driven rain, salt spray (fog), mildrew, long lasting	2 hrs touch Overnight recoat	

Waterproofing Concrete/Masonry Sealers

Coating Company, Product Name, Components	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal) @3mils	Recommended substrate/ exposure	Coating Characteristics	Drying time to recoat	Cost per Gallon (dollars)
Benjamin Moore, 100% Acrylic Elastomeric Waterproof Coating Low Lustre 055, White	250	39	60-80	Uncoated or new masonry and previously painted surfaces such as stucco, concrete/cinder block, fiber cement siding, pre-cast concrete, poured in place concrete, and tilt-up construction	Resistant to wind driven rain, salt spray (fog), mildrew, long lasting	2 hrs touch Overnight recoat	
Benjamin Moore, Moorlastic, Elastomeric-Fine Texture 060, White	250	49	40-80	New and previously painted stucco, concrete block, cast-in-place, precast, tilt-up concrete, exterior insulation finishing systems (EIFS), brick, wood, and metal	Capable of 330% elongation, mildew resistant,wind driven rain resistant, allows water vapor transmission	2 hrs touch 4-6 hours	
Benjamin Moore, Masonry Sealer 066, White	200	13	200-400	Concrete, masonry, stucco, block construction	Excellent adhesion, alkali resistant	1 hr touch 4 hrs recoat	14.99
Hill Brothers, Concrete/Masonry Floor Paint & Sealer-Pigmented	200	6	400-450	Concrete, masonry, floors, porches, patios	Excellent adhesion, deep penetrant, scuff resistant, non-yellowing	24 hrs	29.95
Sherwin Williams, H & C Block Shield Masonry Waterproofer, White and various colors	173	42	75-150	Interior & exterior concrete, masonry stucco, bricks	UV resistant, above and below grade application	1 hr touch 3 hrs recoat	26.99
Columbia, Master Grip Modified Acrylic Primer 05-054, Off-white	156	41	215	Interior, exterior masonry, concrete, brick & concrete block	Excellent adhesion, alkali resistant, high coverage	1-2 hrs touch 16 hrs recoat	19.59
Rainguard, American 500 Colored Masonry Deck Sealer	109	N/A	120	Masonry, balconies, decks, patios, driveways, walkways	Slip resistant, excellent adhesion, weather resistant, fast drying	1-2 hours	26.00
Products with a VOC Content at the Proposed Limit and Below							
Poly-Carb, Mark 87.6 Smooth Elastomeric Wall Coating	100	N/A	N/A	Block, concrete, stucco and cement	Flexible, breathable, UV resistant	N/A	
Sherwin Williams, ConFlex XL Texture High Build A5-800 Series, Most Colors	94	49	70-80	Concrete, stucco, masonry	Extremely strong adhesion, mildew resistant, flexible, durable	4 hrs touch 24 hrs recoat	34.99
Sani-Tred, AR-SF Colorcoat (Gray, Tan or White)	78	90	N/A	Concrete decks, metal, wood, masonry	Water repellent, excellent adhesion, UV, chemical, blister, cracking, peeling resistant	N/A	77.75
Everest Coatings, Evercoat 700S High Modulus Waterproof Coating, 1	69	60	50-100	Concrete, masonry, stucco	Durable, UV, mildew resistant, good adhesion	3 hrs touch 12-24 hrs recoat	16.00

Waterproofing Concrete/Masonry Sealers

Coating Company, Product Name, Components	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal) @3mils	Recommended substrate/ exposure	Coating Characteristics	Drying time to recoat	Cost per Gallon (dollars)
Degussa/ChemRex, Thorocoat DOT	58	49	60-100	Vertical and overhead concrete surfaces, DOT concrete structures, previously coated surfaces	Resists wind driven rain, weathering, erosion and impact, water vapor permeable, recoatable	1-2 hrs touch 2-4 recoat	
Degussa/ChemRex, Thorocoat F-74	56	49-51	N/A	Pedestrian traffic concrete decks, floors, walkways, stairs, wimming pool decks	Skid, UV, weather resistant	24 hrs cure	
Vista Paint, 500 Solotex Concrete Masonry Sealers 4600 Uniprime II, White and Tintable	58	51	35-60	Concrete, stucco, plaster, masonry	Excellent elongation, superior adhesion, durability	4 hrs touch 8 hrs recoat	24.03 (120.17 for 5 gal)
Degussa/ChemRex, Thorolastic	38-50	58	50-100	Exterior above grade concrete structures, brick and concrete masonry	Flexible, breathable, UV, wind driven rain, CO_2 resistant	6 hrs touch 12-24 recoat	
Degussa/ChemRex, Thorogard	44	47	80	Exterior, above grade walls, previously coated surfaces, aged stucco, concrete, plaster	Flexible, breathable, UV, weather resistant	5 hrs touch 12-24 hrs recoat	
EVR-Gard Coatings, 119 Elastomeric Wall Coating, White and custom colors	25	45	50-100	Wood, masonry, concrete, metal	Tough, flexible, water repellent	1 hr touch 24 hrs recoat	11.60
EPMAR, Tru-Kote 1120 High Solids Epoxy, 2 component, Various Colors	0	N/A	225-450 per 50 lbs	Concrete, block, brick, porous stone, basements and retaining walls, bridges, foundations, above and below grade	Breathable, waterproof, covers defects and blemishes	7-10 day cure	
	0	95	250-300	Concrete, masonry, fiberglass	Excellent adhesion, chemical resistance, 30 minute pot life	6-8 hrs recoat	36.50
Poly-Carb, Mark 154 (2 component)	0	N/A	N/A	Highway bridge decks	Flexible, de-slicking	N/A	
Poly-Carb, Mark-163 Flexogrid (2 component)	0	N/A	N/A	Highway bridge decks	Flexibe, de-slicking, non-porous, fast-curing	N/A	
Gaco Western Inc., GacoFlex LM-60 Urethane Black, 2	0	100	25	Concrete, metal & plywood	Excellent resistance to water immersion, good alkali and salt resistance, durable, 1 hour pot life	N/A	
Both Clear and Pigmented							
Products with a VOC Content between the Current and Proposed Limits (250 g/l to 101 g/l)							
Benjamin Moore, Moore's Alkyd Masonry Sealer C077, White/Clear	350	55	100-300	Exterior Use on masonry surfaces	N/A	N/A	23.99

Waterproofing Concrete/Masonry Sealers

Coating Company, Product Name, Components	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal) @3mils	Recommended substrate/ exposure	Coating Characteristics	Drying time to recoat	Cost per Gallon (dollars)
Products with a VOC Content at the Proposed Limit and Below							
JFB Hart Coatings, Inc HP-146 Clear/Pigmented	100	33	240-480	Steel, aluminum, galvanized metal, concrete/block, masonry, wood	Superior color, gloss retention, non-yellowing, good chemical and abrasion resistance	8 minutes to touch, 30 minutes to recoat	65.00
Okon, Waterstopper OK-970, Tintable	90	70	N/A	Basement walls, block walls, brick, foundations walls, retaining walls, stucco	Low abrasiveness, non-flammable, UV resistant, breathable	0.5 hrs touch 3 hours recoat	
JFB Hart Coatings, Inc HP-105 Clear/Pigmented E/I, 2	0	53	350-450	Steel, aluminum, galvanized metal, concrete/block, masonry	Non-yellowing, UV and chemicals resistant, flexible, mar and abrasion resistant	6-8 hrs recoat	80.00

N/A= Not Available

SUMMARY OF EMISSIONS

Coating Categories At Proposed VOC Limit	AQMD Emission Inventory		AQMD Emission Reduction	
	Tons per Year	Tons per Day	Tons per Year	Tons per Day
Clear Wood Finishes - 275 g/l	229	0.628	78	0.21
Clear Wood Finish Quarts - 275 g/l	445	1.218	303	0.83
Sanding Sealers - 275 g/l	3	0.009	1	0.003
Roof Coatings - 50 g/l	714	1.955	582	1.59
HS Ext. Stains - 100 g/l	340	0.931	207	0.57
Waterproofing Sealers - 100 g/l	160	0.439	100	0.27
Waterproofing Concrete/Masonry Sealers - 100 g/l	126	0.346	91	0.25
Total	**2,017**	**5.527**	**1,362**	**3.73**

A P P E N D I X C

COMPARATIVE ANALYSIS

COMPARATIVE ANALYSIS OF ARCHITECTURAL COATING RULES

	Rule 1113 – Architectural Coatings	40 CFR, Subpart D – National Volatile Organic Compound Emission Standards for Architectural Coatings
Applicability	Any person who supplies, sells, offers for sale, or manufactures architectural coatings to be field applied to stationary structures or their appurtenances, and to mobile homes, pavements or curbs as well as any person who applies or solicits the application of architectural coatings in the District.	Each architectural coating manufactured on or after September 13, 1999 for sale or distribution in the U.S., except architectural coatings registered under the Federal Insecticide, Fungicide, and Rodenticide Act manufactured on or after March 13, 2000 for sale or distribution in the U.S.
VOC Content Limits	250 g/l or VOC limits specified in the Table of Standards on specified effective dates.	VOC content not to exceed applicable limit in Table 1.
Most Restrictive VOC Limit	Lowest VOC limit applies if a coating label or literature implies that the coating may fall into two or more categories. 5 exemptions.	Lowest VOC limit applies if a coating label or literature implies that the coating may fall into two or more categories. 17 exemptions.
Sell-Through Provision	If manufactured prior to effective date of applicable VOC limit in Table, 3 year sell through including application.	None
Compliance Options	An annual averaging program that allows coatings to be sold with a VOC content greater than the applicable limit, that are offset with a greater volume of sales with a VOC content below the applicable limit. Emissions must be at or below levels as if all sales were compliant. Appendix A - Requirements for Averaging Provision.	Exceedance fees for manufacturers of coatings above the applicable VOC limit. Tonnage exemption if VOC contained in coatings selected for exemption is equal to or less than 10 tons per year. No Averaging Provisions Requirements.
Container Labeling Requirements	Date of Manufacture or code that displays the date of manufacture. Thinning recommendations, does not include thinning with water. Coating VOC content as supplied and after manufacturers recommended thinning. Coating VOC content and Material VOC content for low-solids coatings. Special labeling for quick-dry primers, sealers and undercoaters, quick-dry enamels, rust preventative coatings, specialty primers and clear brushing lacquers.	Date of Manufacture or code that displays the date of manufacture. Thinning recommendations, does not include thinning with water. Coating VOC content as supplied and after manufacturers recommended thinning. Material VOC content for low-solids coatings. Special labeling for industrial maintenance coatings and recycled coatings.
Reporting Requirements:	Annual reports for sales in gallons of clear brushing lacquers, quart containers or less, recycled coatings, rust preventative coatings and specialty primers. Recycled paint manufacturers must submit a	Recycled coatings records. Exceedance fee records. Tonnage exemption records. Initial notification report from each manufacturer and importer of any

	Rule 1113 – Architectural Coatings	40 CFR, Subpart D – National Volatile Organic Compound Emission Standards for Architectural Coatings
	letter certifying they are manufacturers of recycled coatings.	architectural coating.
Test Methods	Determination of VOC content: USEPA Reference Test Method 24 and for exempt compounds by SCAQMD Method 303 or SCAQMD Method 304. Acid Content of Coatings: ASTM Test Method D 1613-85. Metal Content of Coatings: SCAQMD Method 311. Flame Spread Index: ASTM Test Method E 84-99. Drying Times and Tack–Free Time: ASTM Test Method D 1640 and ASTM Test Method D 1640 (Mechanical Test Method) respectively. Gloss Determination: ASTM Test Method D 523. Equivalent Test Methods: Other test methods determined to be equivalent by the staffs of the District, the California Air Resources Board, and the USEPA, and approved in writing by the District Executive Officer may also be used.	Determination of VOC content: USEPA Reference Test Method 24 (Method 24 prevails). Formulation data, or any other reasonable means for predicting that the coating has been formulated as intended (e.g., quality assurance checks, recordkeeping. Alternative Methods: The Administrator may approve, on a case-by-case basis, a manufacturer's or importer's use of an alternative method in lieu of Method 24 for determining the VOC content of coatings if the alternative method is demonstrated to the Administrator's satisfaction to provide results that are acceptable for purposes of determining compliance with this subpart.
Technology Assessments	For future VOC limits for flats; lacquers; nonflats; primers, sealers, and undercoaters; quick-dry enamels; waterproofing sealers; stains; floor; rust preventative and industrial maintenance coatings.	None
Exemptions	Containers of one quart or less. Clear wood finish quart container exemption will be phased out ~~1/1/08~~either in 2006 or 2008. Coatings manufactured for sale outside AQMD jurisdiction. Emulsion type bituminous pavement sealers. Aerosol coating products. High altitude use of stains/lacquers above 4,000 feet. Thinning to avoid blushing with humidity above 70% and temperature below 65 degrees F at certain times of the year and with a maximum VOC content if the coating contains acetone.	A coating that is manufactured for sale or distribution to architectural coating markets outside the United States; such a coating must not be sold or distributed within the United States as an architectural coating. A coating manufactured prior to September 13, 1999. A coating that is sold in a non-refillable aerosol container. A coating that is collected and redistributed at a paint exchange. A coating that is sold in a container with a volume of one liter or less.

	Rule 1113 – Architectural Coatings	40 CFR, Subpart D – National Volatile Organic Compound Emission Standards for Architectural Coatings
	Extended VOC limits for Small Businesses meeting specific criteria. Research and development test specimens.	

APPENDIX D

COMMENT LETTERS RECEIVED AND RESPONSES TO COMMENTS

Comment Letter #1 – BEHR Process Corporation

South Coast Air Quality Management District MVB-03045
21865 E. Copley Drive
Diamond Bar, California 91765-4182

Attention: Mr. Dan Russell
Air Quality Specialist

RE: Proposed Amended Rule 1113 – Architectural Coatings
Comments from Public Workshop held September 4, 2003

Dear Mr. Russell,

1-1 Behr Process Corporation has reviewed SCAQMD's proposed amendment draft to Rule 1113. While we are in agreement with many of the proposed revised VOC limitations, we have concerns pertaining to specific coating categories, the timeline for implementation (Jan. 1st, 2005), and the elimination of the small container exemption in select categories.

1-2 Under the coating categories "Low Solids Interior Stains" and "Low Solids Waterproofing Sealers", we believe the new proposed limits are achievable with current water-based technology to meet the needs of our market. We also agree that these limits should go into effect as proposed (Jan. 1, 2005).

1-3 Behr also agrees that the new proposed limits can be achieved in the "Clear Wood Finishes" category, with the exception of products sold exclusively under the small container exemption. We believe that currently available technology will not support formulation of suitable low VOC replacement products, particularly in the "Varnish" subcategory. Removal of the small container exemption will effectively eliminate the highest performing products in this market niche. At the same time, we recognize that the exemption may inhibit rather than foster new technology development in this category, as evidenced by the high VOC content of the majority of quart sales. To allow a suitable timeframe for technology advancement, reformulation, and exterior exposure testing, a VOC limit of 350 g/l on small containers, effective Jan. 1, 2006 is recommended, subject to further reductions in the future.

1-4 While we agree that existing technology can achieve the proposed new VOC limits for "Roof Coatings", reformulation will require exterior exposure testing, necessitating a longer timeline for implementation. An effective date of Jan. 1, 2006 is recommended.

1-5 Under the category of "Stains", we believe that further segmentation of these products is necessary, based on opacity (solid color vs. clear & semi-transparent). The following two subcategories are necessary:

1-5 Opaque or solid color stains, whether intended for horizontal or vertical application, can be readily formulated at the proposed limit of 100 g/l VOC. However, for this proposed Stain subcategory, we propose an effective date of Jan 1, 2006, to provide a reasonable time frame for reformulation, performance testing, and exterior exposure work.

Non-opaque or transparent stains (including clears, toners, and semi-transparent stains) formulated at 100 g/l VOC will require extensive technology review, reformulation, performance testing, field testing, and exterior exposure work prior to introduction of new, compliant products. It will not be possible to complete work necessary to ensure quality performance of this "Stain" subcategory by the proposed effective date.

1-6 Behr Process has been an industry leader in the introduction of water-based products in this category. Our greatest challenge in promoting water-based transparent and semi-transparent stain technology has been overcoming the inherently poorer application characteristics vs. traditional solvent-based products, particularly in the areas of lapping[1] and open time[2]. We believe the current established VOC limit of 250 g/l remains necessary for this proposed subcategory for this reason. This position is supported by a review of products listed in Appendix A of the Proposed Amended Rule 1113 as well as Behr's internal market studies which have not identified any existing non-opaque stains that currently meet the proposed 100 g/l VOC limit.

1-7 Non-opaque stains can be further sub-categorized into two groups based on intended application surface: those intended for use on vertical surfaces only, and those intended for use on both horizontal and vertical surfaces. The intended application dictates the amount of research, field-testing, and weathering studies necessary for new product introduction.

Non-opaque stains intended for application to vertical surfaces only (such as siding, fencing, etc.) require reformulation followed by weathering performance studies. While exposure testing can be accelerated (South 45 degrees Florida exposure, for example) a minimum of one year of exterior weathering is needed to provide claim support data for such a change. For these products, an effective date of Jan 1, 2006 is recommended.

Non-opaque stains intended for use on horizontal and vertical surfaces have the added complication of requiring wear and abrasion resistance properties. Short of actual field-testing, there exists no accepted accelerated test method for measurement of wear and abrasion resistance properties of penetrating finishes on wood substrates. For non-opaque stains intended for horizontal use, an effective date of Jan. 1, 2007 is recommended.

1-8 We also do not support the proposed limits and timeline for the "Waterproofing Sealers" category.

In our #500 series of Premium Weatherproofers, we believe Behr offers state-of-the-art products combining alkyd/acrylic dispersion with silicone emulsion technology to provide

both aesthetic appearance and waterproofing protection to horizontal substrates lasting
up to 4 years. This product family, along with Behr #300 and #400 series of exterior
1-8 stains require classification as “Waterproofing Sealers” due to their proven water
repellency performance. Reformulation will require evaluation of new, experimental
resin systems followed by one to two years of accelerated weathering and wear testing
to satisfy the claim support requirements for this product family. An effective date of
Jan. 1, 2007 is recommended.

The effective dates for categories “Waterproofing Concrete/Masonry Sealers” and “Low
Solids Waterproofing Concrete/Masonry Sealers” should also be re-evaluated. Behr
#980 Concrete & Masonry Waterproofer, which already complies with the proposed
1-9 lower 50 g/l VOC limit, required in excess of two years product development time.
While technology clearly exists to meet the new proposed levels, formulation and field
performance testing for this category is significant. An effective date of Jan. 1, 2006 is
recommended.

Overall, while Behr supports the direction of the proposed amendment to Rule 1113, we
ask that the "Roof Coatings”, “Stains", “Waterproofing Sealers”, and “Waterproofing
Concrete/Masonry Sealers” categories be closely examined in order to establish more
appropriate timelines for implementation. We also suggest that elimination of the small
1-10 container exemption for “Clear Wood Finishes” be reconsidered in favor of an imposed
VOC limit for this category. We believe the current timeline will either prohibit the sale of
superior technology products or result in manufacturers assuming unnecessary risk
associated with introducing unproven products into the marketplace. Behr would
welcome further discussion on these subjects.

1 lap (coatings) - the region where one area of a coated surface merges into an adjacent freshly-coated area during application of a single coat to the entire surface. (ASTM D16)

2 open time - length of time a coating remains wet enough to allow for brushing-in at the laps; also called wet edge time. (ASTM D16)

Respectfully submitted,

MICHAEL V. BUTLER
Director – Environmental & Regulatory Affairs

cc: Naveen Berry, South Air Quality Management District
Paul Eisele, MASCO Corporation

Comment Letter #2 – Dunn Edwards Paints

Dunn-Edwards PAINTS ® THE PAINT THAT PROTECTS.®

September 12, 2003

HAND DELIVERED

Dan Russell
Planning, Rule Development & Area Sources
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 East Copley Drive
Diamond Bar, CA 91765

RE: PROPOSED AMENDED RULE 1113 – ARCHITECTURAL COATINGS

Dear Dan:

Dunn-Edwards Corporation is an employee-owned business with roots going back to 1925. Since that time, Dunn-Edwards has grown from a small, local enterprise into a major regional manufacturer and distributor employing more than 1,300 people. Our facilities include three factories, four warehouses, and more than 70 store locations in California, Arizona, Nevada, New Mexico and Texas. Dunn-Edwards manufactures high-quality architectural coatings that are marketed primarily to professional painting contractors and institutional maintenance accounts, including schools, hospitals, commercial facilities, and public agencies. Our main office and factory complex, as well as many of our store locations, are within the jurisdiction of the South Coast Air Quality Management District ("SCAQMD"). Consequently, Dunn-Edwards has long been interested and involved in air quality regulatory matters affecting architectural coatings within the SCAQMD.

This letter is to summarize and expand upon the comments offered on behalf of Dunn-Edwards at the Public Workshop held on Thursday, September 4, 2003, to discuss proposed amendments to Rule 1113 – Architectural Coatings. Our comments focus primarily on four aspects of the proposed amendments, as listed below along with specific recommendations.

EFFECTIVE DATE

2-1 New (and substantially lower) VOC content limits and other requirements for various coating categories are proposed to become effective on January 1, 2005. This would allow only about one year between the date of adoption and date of implementation for the amendments. This timeframe is entirely insufficient to allow for necessary research and development, laboratory-and field-testing, long-term exterior exposure studies, and revision of labels and product literature. The average timeframe for development and introduction of new formulations in the coatings industry is from three to five years. Allowing less than this amount of time is to risk rushing to market with products that will not perform adequately, resulting in costly failures that necessitate re-coating and, consequentially, increased VOC emissions.

2-1

Alternatively, the proposed early implementation date would have significant anti-competitive impacts on the market, effectively delivering the market for certain categories of coatings to the few manufacturers who may already have some products that comply with the proposed new limits. Other manufacturers would be shut out, denied any opportunity to develop, test, and bring to market new complying formulations before the implementation date. This could also lead to stockpiling of higher-VOC materials for sale under the rule's "sell-through" provision. Also, no investigation has yet been conducted to determine whether currently available products complying with the proposed new limits would be adequate substitutes for higher-VOC products that would be banned by the new limits. Use of inadequate substitutes can lead to a variety of counterproductive, adverse environmental impacts.

In the last two rounds of major amendments to Rule 1113, substantially more phase-in time was allowed. The 1996 amendments were given effective dates ranging from 1998 through 2008 (up to 12 years later); and the 1999 amendments were to be implemented between 2002 and 2006 (up to seven years later). Moreover, under the terms of a settlement agreement reached in December 1999 between SCAQMD and a coalition of environmental groups that had sued the District over its failure to implement fully the 1994 Air Quality Management Plan, the "Phase 3" amendments to Rule 1113 were to be adopted in 2003 and implemented from 2006 through 2008.

RECOMMENDATION: Schedule the effective date of all new VOC content limits and other requirements included in the current proposed amendments for January 1, 2008.

* * *

SMALL CONTAINER EXEMPTION

2-2

One proposed amendment would exclude Clear Wood Finishes from the Small Container Exemption after lower VOC content limits become effective for Varnish and Sanding Sealers. This would materially impair the usefulness of the Small Container Exemption, since a significant portion of the products supplied under the exemption are stains, sanding sealers, and varnishes, especially those formulated as fine furniture finishes. Technically, these coatings are not subject to regulation under Rule 1113 unless applied to appurtenances that are attached to an architectural structure (e.g., doors, kitchen cabinets, built-in bookcases, or handrails). Nevertheless, the Small Container Exemption has been an important part of architectural coatings regulation from the start, and is currently a feature of every architectural coatings rule in the country.

The Small Container Exemption serves a number of useful purposes within the context of
2-2 architectural coatings rules, as has been discussed with the SCAQMD, ARB, and U.S. EPA at various times over the past 25 years. Enclosed with this letter are copies of correspondence with the SCAQMD, explaining the purposes of the exemption.

Not the least of these purposes is that the Small Container Exemption actually makes the rules more effective in reducing VOC emissions, and the elimination or limitation of the Small Container Exemption would result in more emissions, not less. (See enclosed letter dated July 26, 1996.) One issue not previously addressed, but particularly relevant here, is the issue of relative reactivity of VOC solvents used in products that would be supplied under the Small Container Exemption, and in products meeting the proposed new VOC content limit for Varnish.

The term "reactivity" refers to the ability of a VOC to promote or inhibit ozone formation. (Potential contribution of VOCs to ozone formation is the reason why VOCs are regulated.) Atmospheric chemists have long known that different VOC species have different reactivities, and that relative reactivities may vary by an order of magnitude or more.

Current VOC regulations (for the most part) seek only mass reductions of all VOC, without regard to relative reactivity (beyond exempting certain marginally reactive VOC). Where regulations result in solvent substitutions, however, relative reactivity becomes very important. Emitting smaller amounts of more reactive VOC, in place of larger amounts of less reactive VOC, may not have any beneficial effect on ozone formation, or may even cause more ozone to form, or to form more rapidly so that population-weighted ozone exposures increase.

2-3

The current limit of 350 g/L allows both conventional solventborne varnishes, and alternative waterborne clear wood finishes. According to the most recent ARB survey of architectural coatings distributed in California, waterborne varnishes have a sales-weighted average VOC content of 266 g/L, which is very close to the proposed limit of 275 g/L. In the "Preliminary Draft Staff Report for Proposed Amended Rule 1113," dated August 19, 2003, SCAQMD staff acknowledges that "[t]raditional varnishes…will not likely meet a proposed limit of 275 grams per liter…." The report also makes it clear that waterborne clear finishes are the most likely substitutes for traditional varnishes.

A review of manufacturers' Material Safety Data Sheets and Product Information Sheets shows that the VOC solvents used in waterborne clear wood finishes typically consist of various glycol and glycol ether compounds. Below is a table (TABLE 1) showing the most common VOC solvents used in waterborne varnishes, along with their Maximum Incremental Reactivity ("MIR") values, as listed in the table incorporated in the ARB statewide regulation for aerosol coatings (one of the few reactivity-based regulations in operation today).

MIR values indicate the amount of ozone that will form, under certain conditions, as a result of the emission of a given amount of VOC (e.g., grams of ozone per gram of VOC emitted). The MIR values of the solvents listed range from 2.56 to 3.36, with an average MIR value of 2.91.

This is significantly higher than the average reactivity of the mineral spirits solvents found in traditional solventborne varnishes.

Also given below is a table (TABLE 2) showing a variety of typical mineral spirits (petroleum distillates with average boiling point generally between 340 and 460 degrees Fahrenheit, with aromatics content less than eight percent by weight). These are the VOC solvents primarily used in conventional solventborne varnishes. ARB classifies aliphatic petroleum distillate hydrocarbon solvents into a number of "bins" according to general characteristics of these complex mixtures.

2-3 The MIR values of the mineral spirits listed range from 0.81 to 1.62, with an average MIR value of 1.15. Thus we find that, to the extent that lowering the VOC content limit for Varnish from 350 g/L to 275 g/L causes a shift from conventional solventborne varnishes to alternative waterborne clear wood finishes, a decrease of 21 percent in VOC content is accompanied by an increase of 153 percent in VOC reactivity. In terms of relative ozone formation impacts of VOC emitted, substituting waterborne clear finishes for conventional solventborne varnishes will almost double the amount of ozone formed, as calculated below:

$$\frac{275}{350} \times \frac{2.91}{1.15} = 1.99$$

Obviously, adopting a VOC content limit of 275 g/L for Varnish would be counterproductive to the air quality goal of ozone reduction. And excluding clear wood finishes from the Small Container Exemption would only compound the problem, by preventing the use of products that would have only half the ozone forming potential of the allowable complying products. Thus, the Small Container Exemption is necessary to mitigate the potential adverse environmental impacts that would result from adopting the proposed lower limit for Varnish.

RECOMMENDATION: Allow the Small Container Exemption to continue as currently given, without any exclusions or limitations on its operation.

* * *

AVERAGING PROGRAM "CEILING LIMIT" FOR QUICK-DRY PRIMERS

2-4 The Averaging Compliance Option of Rule 1113 is the most significant innovation in regulatory strategy for architectural coatings in 25 years – since the first Model Rule was developed by ARB. Averaging allows limits to be met – and emission reductions to be made – while allowing manufacturers greater flexibility in determining the mix of products that will achieve compliance with the rule. As originally adopted and implemented, the averaging provision imposed no restrictions on the VOC content of products included in an averaging program, so long as the program achieved a favorable balance of actual to allowable emissions, thereby complying with

TABLE 1

Solvents Used in Waterborne Clear Wood Finishes

Chemical Name	CAS Number	MIR Value
Ethylene Glycol	107-21-1	3.36
Ethylene Glycol Monobutyl Ether	111-76-2	2.90
Diethylene Glycol Monoethyl Ether	111-90-0	3.19
Diethylene Glycol Monomethyl Ether	111-77-3	2.90
Dipropylene Glycol Monomethyl Ether	34590-94-8	2.70
n-Methyl Pyrrolidone*	872-50-4	2.56
Propylene Glycol	57-55-6	2.75

* Prop. 65-listed chemical known to cause cancer.

TABLE 2

Mineral Spirits Used in Soventborne Varnishes

Description	Criteria	ARB Bin Number	MIR Value
Mineral Spirits, Type I, Class B	Alkanes (2 to <8% Aromatics)	14	1.21
Mineral Spirits, Type I, Class C	Alkanes (<2% Aromatics)	11	0.91
Mineral Spirits, Type II, Class B	(High Flash) Alkanes (2 to <8% Aromatics)	14	1.21
Mineral Spirits, Type II, Class C	(High Flash) Alkanes (<2% Aromatics)	11	0.91
Mineral Spirits, Type III, Class C	(Odorless) N- & Iso-Alkanes (≥90% and <2% Aromatics)	12	0.81
Mineral Spirits, Type IV, Class B	(Low Dry Point) Alkanes (2 to <8% Aromatics)	9	1.62
Mineral Spirits, Type IV, Class C	(Low Dry Point) Alkanes (<2% Aromatics)	6	1.41

the rule limits "on average." Later, ARB introduced the concept of "ceiling limits" on the VOC content of products included in an averaging program. This was to address concerns that new, higher-VOC products not previously available would be introduced to California markets in averaging programs that were regarded as untested and experimental. Rule 1113 was subsequently revised to include a restriction that "a manufacturer shall not include in an averaging program any coating with a VOC content in excess of the maximum VOC content in effect, for that manufacturer, immediately prior to July 1, 2001, or the VOC content limits specified in the National VOC Emission Standard, whichever is less."

Immediately prior to July 1, 2001, Quick-Dry Primers, Sealers & Undercoaters distributed in the SCAQMD were exempt from VOC content limits, provided the manufacturer filed an annual report with the District. The VOC content limit specified for this category in the National VOC Emission Standard was (and is) 450 g/L, which became the de facto "ceiling limit" for any Quick-Dry PS&U included in an averaging program. This is consistent with the 450 g/L ceiling limit applied to this category in other local district rules implementing the ARB Suggested Control Measure for Architectural Coatings throughout the state.

2-4 Staff is now proposing to eliminate the 450 g/L ceiling limit effective July 1, 2006. It is unclear, however, whether no ceiling limit would then apply or some lower limit (and if so, what limit). If the previous limit for Primers, Sealers & Undercoaters (350 g/L) were to apply, as staff seemed to suggest at the recent Public Workshop, the effect would be simply to ban the inclusion of any Quick-Dry PS&U in an averaging program, since all such products previously distributed in the SCAQMD had VOC contents above 350 g/L. (Otherwise, the products would have been categorized as general purpose Primers, Sealers & Undercoaters.)

We believe this exclusion is unnecessary, serves no useful or beneficial purpose, and may cause significant harm because of the inadequate performance of available substitutes for Quick-Dry PS&U products. It is also fuels misunderstanding of the nature and value of the averaging compliance option as a regulatory strategy for achieving the same VOC reductions as strict compliance with categorical VOC content limits.

Quick-Dry PS&U with VOC contents up to 450 g/L have no "excess emissions" so long as they are part of a balanced, complying averaging program. For those manufacturers who have made necessary adjustments to successfully include such products in a complying averaging program, the arbitrary exclusion of the products would be discriminatory and burdensome.

RECOMMENDATION: Allow the current provisions relating to inclusion of Quick-Dry Primers, Sealers & Undercoaters in an approved averaging program to stand without alteration.

* * *

WATERPROOFING CONCRETE/MASONRY SEALERS

A separate specialty coatings category for Waterproofing Concrete/Masonry Sealers was established as a break-out subcategory of Waterproofing Sealers at a time when a lower VOC content limit was deemed technologically and economically feasible for Waterproofing Sealers, but not for Waterproofing Concrete/Masonry Sealers. Similarly, the Waterproofing Sealers category was itself a break-out subcategory of the general purpose Primers, Sealers & Undercoaters category, created when a lower limit was placed on the broader category.

2-5 The current proposed amendments would reduce the VOC content limit for Waterproofing Sealers and Waterproofing Concrete/Masonry Sealers from current levels (250 g/L and 400 g/L, respectively) down to 50 g/L for both. The limit for Primers, Sealers & Undercoaters is currently 200 g/L, with a reduction to 100 g/L scheduled for July 1, 2006. Given the highly specialized and functional nature of the waterproofing sealer categories, any limit lower than (or equal to) that assigned to the general purpose PS&U category would be inappropriate.

This is especially true for the Waterproofing Concrete/Masonry Sealers, which (as defined) must "provide resistance against water, alkalis, acids, ultraviolet light, and staining" under a full range of demanding exterior exposure conditions. Damages resulting from the failure of a Waterproofing Concrete/Masonry Sealer can be extensive and costly to repair, or even hazardous to human health and safety. In any case, reducing the VOC content limit for this category as proposed would likely cause manufacturers to re-categorize such products as Sealers (separately defined) included in the general purpose PS&U category, as was previously the case.

RECOMMENDATION: Establish a VOC content limit of 200 g/L for Waterproofing Sealers, effective January 1, 2008, and a limit of 300 g/L for Waterproofing Concrete/Masonry Sealers, also effective January 1, 2008. All low-solids waterproofing products should be included in the Low-Solids Coatings category with a "Material VOC Content" limit of 120 g/L.

If you have any questions regarding this letter, please feel free to call me at (323) 826-2663.

Very truly yours,

DUNN-EDWARDS CORPORATION

Robert Wendoll
Director of Environmental Affairs

cc: Laki Tisopulos
Howard Berman

Enclosures: NPCA & EL RAP Joint Letter to Dr. James Lents, dated September 1, 1993
EL RAP Letter to SCAQMD Governing Board, dated January 12, 1996
EL RAP Letter to Darren Stroud, dated July 26, 1996

Comment Letter #3 – Henry Company

Henry COMPANY®

12 September 2003

Daniel Russell
Bill Milner
SCAQMD
21865 E. Copley Drive
Diamond Bar, CA 91765-4182

re: Comments on the 15 August 2003 draft proposed revision to Rule 1113

Gentlemen:

To supplement the testimony given at the 4 September Public Workshop, Henry Company submits the following comments on the draft proposed revision to Rule 1113.

c (2) Table of Standards: Roof Coatings

The draft proposes to reduce the maximum VOC content of all products classified as "roof coatings" to a limit of 50 g/l. The staff report appears to give as a rationale the fact that there are water-based coatings with low VOC content which are appropriate for most of the asphalt-based membranes used in the District under most conditions.

3-1

Like the other specialty coating categories, "roof coatings" as a broad class fulfill a number of functional purposes beyond simple decoration. All protect the waterproofing membrane from exposure to sunlight, air and ozone, and water, and so preserve the life of the system. However, this category contains a number of more specialized products which provide additional functions which are unique to specific substrates and weather conditions.

Sweeping all possible materials into a single category will ban necessary niche functions, for which no substitutes are available; this has not been addressed in the staff report supporting this draft.

HENRY GROUP OF COMPANIES 2911 SLAUSON AVENUE, HUNTINGTON PARK, CA 90255 (323) 583-5000 FAX (323) 582-6429 (323) 589-1187

Dual regulation

Many products regulated as "roof coatings" under Rule 1113 provide additional functionality beyond that of a sacrificial protective layer or of a base coat for a final reflective top coat. When applied they become an integral part of the waterproofing system, thus becoming part of the "sealant" function of the roof. To further complicate the issue, by changing the method and quantity of application and by adding reinforcement, some materials which could be used as simple sacrificial, base, or top coatings can also be used to create a primary waterproofing membrane – i.e., they are "non-membrane roof sealants" under Rule 1168.

3-2 Page III-3 of the staff report acknowledges that there are "crossover" materials with Rule 1168, although there are several crossover products besides the bituminous roof coatings discussed. The report seems to suggest that if such materials are given a topcoat they will be treated as "coatings," but if not top-coated they would be regulated as "adhesives and sealants." While there may be a workable way to make this distinction, there is no support for this in Rule 1113 at this time. Moreover, there is no way an inspector could determine the proper categorization of a product until it is actually in use, which will lead to enforcement problems since Rule 1113 applies to manufacturers and sellers as well as to users.

We suggest that specific language be included in Rule 1113 to clarify this issue. In particular, we suggest changes to the draft Rule to address the two most common types of products which "cross over" with Rule 1168 – bituminous coatings and thermoplastic resin coatings.

Bituminous roof coatings

3-3 There are a variety of products used in the District which qualify as "Bituminous roof coatings," a category that existed in Rule 1113 until last December. The staff report notes that the majority of such products used in the District are probably waterborne clay emulsions; we believe this is correct, and that the use of solvent-borne asphaltic coatings as coatings is uncommon to very rare. These products are more difficult to apply than emulsions, and do not weather as well in Southern California as the clay emulsions do.

We believe that the majority of solvent-borne bituminous roof coatings used in the District are used to perform emergency repairs when temperatures or approaching weather preclude the use of water-borne products. Thus virtually all uses of these products are as sealants, i.e. as a "cross-over" use with Rule 1168.

Recommendation for solvent-borne bituminous roof coatings

Under the circumstances, we suggest that the definition of "bituminous roof coating" be restored, and that Rule 1113 explicitly state that solvent-borne bituminous roof coatings shall be regulated by Rule 1168 alone.

Thermoplastic resin coatings

The staff report does not address a second category of solvent-borne roof coatings – specialty products made with thermoplastic resins. These products tend to be very high
3-3 performance products designed for narrow ranges of substrates. An example would be urethane or silicone white coatings used to protect sprayed urethane foam roof systems. These products provide superior durability, especially where climate or other environmental extremes at the site preclude the use of other products.

We believe that there are no substitutes for these products that provide equivalent performance in the small niches where they are used.

Recommendation for solvent-borne thermoplastic resin coatings

We recommend adding a new (to the SCAQMD) specialty coating definition of "thermoplastic resin coating" modeled on the Federal AIM rule, and that products within this specialty category be allowed a maximum VOC limit of 250 g/l.

b (30) Metallic Pigmented Coatings

The draft proposes to delete roof coatings from this specialty category of coatings.

Staff has not provided any rationale for this change. The effects of this change were not discussed in any of the economic or environmental analyses supporting the draft.

Metallic pigmented roof coatings are a substantial element of low-slope and high-slope commercial and residential roofing technology in the District. Like all roof coatings, these
3-4 products protect the underlying waterproofing membrane from direct exposure to the elements. They also shed a large fraction of the heat that would be absorbed by the roof, and for some systems they are the critical difference between passing and failing a particular fire rating requirement.

Solvent-borne aluminum pigmented coatings provide specific advantages over water-borne coatings, whether asphalt- or latex-based. Among other factors, they have a much broader safe applications temperature window; when properly applied, they can be much more durable; they are much more tolerant of poor surface conditions; and they are generally compatible with a broader range of substrates than individual water-borne products.

Staff has not stated why these products should be banned, other than the suggestion that VOC-compliant waterborne aluminum coatings exist, or that the proposed 2005 revision of the California Energy Code may ban them. Neither of these is correct.

Waterborne aluminum coatings are fairly commonly used in southern California. However, these products are for professional use only because they have a limited shelf life – eventually the water breaks down the protective film on the aluminum flakes and starts a runaway chemical reaction, oxidizing the aluminum and generating hydrogen gas. These products can not replace conventional metallic-pigmented roof coatings which have unlimited shelf life.

In addition, we do not believe that anyone makes a water-borne aluminum coating which complies with the proposed 50 g/l limit for "generic" roof coatings. A good quality product will have at approximately 1.5 pounds of aluminum paste per gallon. Water-resistant paste is typically 65% solids (metal + wax film), with the rest being mineral spirits. This means that there will be roughly 1 pound of metal pigment and approximately 0.5 lb/gal of VOC per gallon
3-4 of product. Since these products are on the order of 50% solids by volume, the resulting VOC content is approximately 120 g/l.

With respect to the proposed CEC Title 24, that regulation does not ban metallic pigmented roof coatings. Firstly, the code only applies to roofs with a slope <2:12 and which protect air-conditioned space. Secondly, while conventional aluminum coatings have difficulty meeting the minimum emissivity requirement of the proposed code, the code provides an alternate standard for low-emissivity coatings that can be met with existing high-end products. Finally, it is possible to design a metallic-pigmented coating which complies with the Title 24 baseline.

<u>Recommendation for metallic-pigmented roof coatings</u>

Delete the proposed clause which would have banned metallic-pigmented roof coatings.

If you have any questions, please call me at (323) 908-5279.

Paul A. Beemer
Director, Legal & Technical Affairs
Henry Company

Comment Letter #4 – Hills Bros. Chemical Co.

HILL BROTHERS Chemical Co.

Over 75 Years of Customer Commitment

Research & Development

15017 E. Clark Ave City of Industry, CA 91745-1497

September 12, 2003

File RD03-005

Mr. Dan Russell
Air Quality Specialist
South Coast AQMD
21865 E. Copley Drive
Diamond Bar, CA 91765-4182

RE: Special Coatings' Category Consideration

4-1 Mr. Russell, as I mentioned to you in my previous letter, the impact of the proposed limits to Hill Brothers Chemical Company is significant. Hill Brothers is one of the very few solvent base sealer manufactures for concrete/masonry applications in Southern California. Over 65% of the sealers manufactured by Hill Brothers are solvent base which also include private labeling. Reducing the limits to less than 50 g/L will force Hill Brothers out of the sealer business because the technology for solvents base products is not available. The loss of the solvent base products will economically prohibit Hill Brothers from operating its sealer manufacturing process, including the waterborne products.

4-2 Hill Brothers (Desert Brand) acrylic solvent base products are marketed and used for residential and commercial applications. The solvent based acrylic sealers are preferred by Hill Brothers' customers over other technologies because the performance is superior to acrylic waterborne products or exterior epoxies and they are less hazardous than urethane/isocyanate products.

4-3 I would like to request a separate category of solvent base sealers for driveways, patios, decks, and garages for residential and commercial applications. I would be more than willing to assist in working out the details for this category.

I would greatly appreciate some consideration to the proposed category, please feel free to contact me at (626) 333-2251.

Sincerely,
Tony Garcia

R&D Director

cc: R. Adams – Corporate, San Jose
R. Hill – Corporate, Orange
M. Thorne – Corporate, Orange

Comment Letter #5 – Life Paints

Dan Russell
Air Quality Specialist
South Coast Air Quality Management District

RE: Rule 1113 Proposal

Dear Mr. Russell,

Here are Life Paint Company's comments regarding SCAQMD's proposals to Rule 1113.

The proposal to change the Roof Coatings category from an allowable VOC of 250 grams per liter to 50 grams per liter January 1, 2005.

5-1 The Roof Coatings category is a very widespread category with many different products for many different applications. If latex roof coatings were a product that could be used in any situation, than a VOC of 50 grams per liter would more than likely be attainable for the Roof Coatings category as a whole. Unfortunately, latex coatings do not work over every roofing situation. Latex roof coatings require one coat of a metal primer (allowable VOC of 200 grams per liter) then one or two top coats of a latex roof coating with a *proposed* allowable VOC of 50 grams per liter. That equals a minimum VOC of 250 grams per liter for a two coat system. An aluminum roof coating would not require the primer, therefore saving the applicator time and money and with an allowable VOC of 250 grams per liter would not allow a larger amount of emissions. Life Paint proposes a subcategory for aluminum roof coatings with an allowable VOC of 250 grams per liter, the current lowered limit. Or, aluminum roof coatings be allowed in the category of Metallic Pigmented Coatings. Also, latex roof coatings cannot be applied in cold weather. Many roof applications are applied during the winter months when a leak is found. During cooler temperatures (especially at night during the critical 24-48 hour initial cure time) low VOC, latex roof coatings will not cure properly allowing film defects such as loss of adhesion, poor film formation which results in poor waterproofing, and severe tackiness which increases dirt pick-up. A solvent based roof coating or a latex based roof coating, with a low temperature coalescent added to it, would solve this problem. Life Paint proposes a subcategory for Low Temperature Roof coatings at an allowable VOC of 250 grams per liter. Life Paint has one other concern regarding the proposed limit from AQMD. The timing of January 1, 2005 is technically infeasible. Life Paint agrees that most roof coatings can be manufactured at or below a VOC of 50 grams per liter, including 100% of our own roof coating products! However, products which are above the 50 grams per liter and are listed on the EPA's ENERGY STAR™ web site need to have a minimum of 3 years exterior exposure! Any change to any formula listed on this website *loses* its listing until the new formula passes the EPA's criteria. That is a minimum of 3 years *without* reformulation. This proposal **discontinues** all products listed on the EPA's website with a VOC greater than 50 grams per liter. Life Paint has two proposals for this problem.

1- Allow any product on the EPA's ENERGY STAR™ to have a three exclusion to January 1, 2008 while enforcing the 50 grams per liter on all other products, or
2- Extend current proposal to be reached January 1, 2008 not January 1, 2005.

This would still reach the AQMD's goal by the year 2010.

5-1 Summary of possible solutions.

>Create a subcategory for Low Temperature Application Roof Coatings at an allowable VOC of 250 grams per liter.

>Create a subcategory for Aluminum Roof Coatings at an allowable VOC of 250 grams per liter or allow aluminum roof coatings in the Metallic Pigmented Coatings category.

>Allow any product on the EPA's ENERGY STAR™ to have a three year exclusion to January 1, 2008 while enforcing the 50 grams per liter on all other products, or

>Extend current proposal to be reached January 1, 2008 not January 1, 2005.

The proposal to combine the Waterproofing Sealers (allowable VOC of 250) category and Waterproofing Concrete/Masonry Sealers (allowable VOC of 400) and drop the VOC limit to 50 grams per liter effective January 1, 2005.

5-2 Please send us all studies that were involved in helping make this decision. Life Paint is having a hard time conceiving the technical possibilities of this action. There are so many possibilities and scenarios in the waterproofing market that it is impossible to believe that all the applications and guarantees within this field could be covered in one category at a maximum allowed VOC limit of 50 grams per liter. I have sent a previous letter before regarding this subject. **Do not assume that certain technologies cover all the markets and applications in this field.** I am not proposing that 50 grams per liter can not be met in *certain* circumstances; I am saying that it cannot be met in *all* waterproofing circumstances. If AQMD wants to lower the emissions in this marketplace, than more discussions must be made and more subcategories must be defined, not combined. Waterproofing is a highly technical field which requires a huge amount of testing depending on the substrate and job performance requested. There are many different types of substrates built *over* different areas. And just because one substrate is concrete and the coating is made for concrete, doesn't denote that the same product can be used. For example, a concrete pool patio would not receive the same specification as a retaining wall, or concrete block wall, or concrete stairs, or lightweight concrete substrates, or a porch, a driveway, a garage floor, or a roof deck. All of these would receive different specifications. The specification is also dependant on whether a horizontal surface is on grade or above grade. And above grade horizontal surfaces specifications are dependant on whether they are over an interior room (such as a hotel room, computer room, a housing room, etc.) or an exterior area (patio, porch, walkway, etc.)

5-3 Regarding silicone based low VOC products that do not form a film. These products are not waterproofing products. They are water repellant according to the raw material suppliers. For the coatings industry to label these products as waterproof would be a false representation thereby incurring lawsuits.

5-4 **The Lowering of the allowable VOC limit for Stains, Varnishes, and Sanding Sealers.**

Life Paint does not manufacture varnishes and sanding sealers. Life Paint will withhold commenting on this proposal.

Comment Letter #6 – National Paint and Coatings Association

September 11, 2003

Mr. Dan Russell
Planning, Rule Development and Area Sources
SCAQMD
21865 Copley Drive
Diamond Bar, CA 91765

RE: Proposed Amendments to Rule 1113 –Architectural Coatings
Comments on Draft Staff Report

The National Paint and Coatings Association would like to submit the following comments on the August 15, 2003 SCAQMD Preliminary Draft Staff Report on the proposal to modify Rule 1113. The members of the NPCA have been actively involved in all of the recent efforts to amend Rule 1113.

6-1 During all of these efforts, our foremost goal has been the development of a rule that balances the need for emissions reductions with the need to maintain availability of coatings that perform adequately for their intended uses. While Rule 1113 has been the subject of lengthy and costly litigation, we are participating in this new rulemaking in the hope that a fair compromise between those two interests can be reached so that future litigation can be avoided. We appreciate those instances in the past where the staff has modified its proposals to take into account industry's concerns and we hope that staff will continue to have an open mind to our suggestions and recommendations.

Request for Revision of Rulemaking Schedule:

6-2 As we indicated at the September 4, 2003, Public Workshop, we have deep concerns about the overall timing of this rulemaking. While the District set out a realistic schedule for the rulemaking in March, the inability to provide a draft proposal for discussion and review by industry until August 19th has changed the situation. The opportunity for the District and industry to have a meaningfully discussion on the all the issues surrounding the proposed amendments has all but vanished.

6-3 As we pointed out in our August 12th letter to Barry Wallerstein…." The effectiveness of the Working Group necessarily turns upon the timely exchange of information. Working Group members should be given staff proposals well in advance of meetings and workshops, thus being allowed sufficient time to review the proposals <u>prior</u> to the meetings so that intelligent and meaningful comments can be provided <u>at the meetings</u>."

6-4 This has not been the case. A good example is the technology assessment for clear wood finishes. It wasn't until the September 4th Public Workshop that staff identified the AVES Study as being used as the bases to justify many of the lower limits for clear wood finishes. Not only was this news to the Working Group but also the staff has yet to make this study available for review.

Therefore we are requesting that the Staff postpone taking the proposed amendments to the Board for a period of at least ninety days The additional time will allow industry to review the AVES study and other technology assessment documents and engage the District staff in a meaningfully dialogue over these amendments during additional Working Group meetings.

Technology Assessment:

6-5 We are disappointed to see that the District continues to base their decision on viability of new technology almost exclusively on product data sheets and Internet ads for products. While the district has indicated that several companies that have conducted side-by-side comparisons of zero, low and high VOC, this data has not been shared with members of the Working Group nor has it undergone any type of peer review that we are aware of. This is the same situation with the site visits, which are mentioned in the draft staff report. We have been told about them but we have yet to see any written reports that document the conclusions of the field trials.

We request that the district make copies of all of the comparative test data and summaries of the field test available to members of the Working Group for their review and comment.

6-6 We are also deeply concerned about the staff's continued reliance on the idea that coatings/coating technology used in an industrial setting (e.g. wood cabinet shop) can readily be used by the do-it-yourself (DIY) consumer. Industrial coatings are formulated to be applied in a control manufacturing setting by highly trained individuals using specialized application equipment. Products sold for application by DIY consumers must meet a higher standard of user friendliness. The district recognizes this very concept by restricting the residential use of industrial maintenance coatings. While a particular coatings technology used in an industrial setting may be formulated to meet the higher demands of the consumer market, the wholesale transfer of industrial coatings products to the consumer market is neither possible nor advisable.

Rule Compliance Dates:

6-7 If the District moves forward with amending the limits for clear wood coatings including varnishes, sanding sealers; roof coatings; stains and waterproofing sealers, the effective dates for the new amendments should to be changed to allow industry sufficient time to meet the revised limits. .

.

The delaying of the effective date should have no real impact on the legal requirements of court order since sufficient VOC reductions will be obtained from the amendment of Rule 1171.

The draft staff technical assessment [Appendix A] indicates that only a very limited number of compliant products are available and the vast majority of these products are not currently being marketed in the south coast district. In addition, there remains the unanswered question as to whether any of these products are viable alternatives to the products currently being sold in the district.

6-7

Therefore there is no doubt that manufacturers supplying the south coast market will be forced to make major product reformulation in order to meet any new limits. Under normal circumstance it takes 3-5 years to reformulate and market a new product This timeframe would includes development of the new product formulation at the required VOC level [if technically feasible]; conducting laboratory testing; field testing; and then test marketing of the new product to insure acceptance in the marketplace. In the case of exterior products with a functional performance criteria, product development times will be longer do to the need for running extended exterior durability tests.

Because of the time needed to reformulate these products, we recommend that any new limits not be effective until at least July 1, 2006.

Elimination of the Small Container Exemption for Clear Wood Finishes

The inclusion of the provision for the elimination of the small container exemption for clear wood finishes took many of us by surprise. At the July 16th working group meeting, staff had indicated that while the idea was still under consideration no action would probably be taken during this round of amendments to the rule.

The quart exemption has played a major role in the allowing manufacturers to provide coatings that meet consumer demand for higher performing products. This is evident in the higher sales of high VOC clear wood finishes in small containers where consumers have spoken with their
6-8 pocketbooks in order to get the coating performance they needed.

The idea that these new low-VOC technologies, which have yet to be tested in the mass consumer marketplace can replace all of the higher VOC clear wood finishes, which are currently being sold in small containers, is unfounded. There are numerous problems that will be caused by the implementation of this amendment. What about the touchup of existing clear coated wood surfaces? These new low VOC technologies are not compatible with many existing clear coated wood surfaces. Will consumers be forced to completely strip and recoat an entire wood surface [e.g. floor] in order to repair a small scratch or mar? If a consumer wants to touch up or refinish an old wooden table or chair [non-architectural objects] will he be forced to use only the low VOC clears? These are but a few of the questions that need to be addressed before any decision on the elimination of the small container exemptions should be made.

6-8 We definitely believe that the elimination of the small container exemption for clear wood finishes is unjustified and should be removed from the proposed amendments.

We look forward to your response to our requests and suggestions and the opportunity to continue the dialogue over these amendments.

Sincerely.

Robert Nelson
Senior Director Environmental Affairs
National Paint and Coatings Association

Comment Letter #7 – OKON Inc.

Dan Russell
Planning, Rule Development and Area Sources
SCAQMD
21865 Copley Drive
Diamond Bar, CA 91765
(909) 396-2333
drussell@aqmd.gov

Re: proposed VOC limits to Rule 1113

7-1 In the past, high levels of VOC in a coating have been associated with a certain level of performance; however, we acknowledge reductions in VOC's from our air are necessary to insure good air quality. In recent years, performance in coatings can and have been maintained at the same time coating reformulations have reduced VOC's. The purpose of applying a coating to a substrate is for some level of performance, appearance or both. Solvent levels (VOC's) in a coating formulation affect performance and appearance. Further reductions of VOC's in a formulation without compromising performance and appearance may be achievable but it will be at a cost and will require time.

7-2 The current VOC limits of the Waterproofing Sealers category are 250 which is a reduction of almost 40% in VOC's from 1998 levels in this category. A further reduction in 2005 to 50 g/l is an additional 80%. The current VOC limits of the Waterproofing Concrete/Masonry Sealers category are 400g/l. Proposals for 50g/l is a reduction in VOC's of over 85% in this category. The current VOC's limits of the Stains category are 250g/l and by the 2005 proposal is a reduction of 60%. Performance, Cost, and Time will be compromised to achieve these VOC levels. More time and or more reasonable reductions are necessary to perform essential reformulating and testing, to ensure minimum performance compromises.

7-3 The products AQMD listed under the categories Waterproofing Sealers, Waterproofing Concrete/Masonry Sealers and Stains are all viable products and are used in different applications on a verity of substrates. Each product listed may be used on a specific substrate. Such as, but not limited to stucco, cast in place concrete, wood, fired brick, foundation brick, block, light weight block, stone, quarry tile, and plaster, ect. Some are clear verses pigmented while others are used above grade verse below grade. Each product may be breathable or non-breathable, penetrating or topical. Each product may require a different application technique such as spray, roll, brush, or wipe. Each product may be a different chemistry; silanes, silicones, polymers, ect. It would not be to the best interest of the end user to lump all of these products into one of these three narrow categories and expect them to perform equally.

These categories are too general in classification. Some of these lower VOC products may perform very well in one application but fail in other applications.

7-4 We at OKON Inc. would hope that AQMD will reconsider the proposed levels of 50g/l as an unreasonable goal for the mentioned categories. The time period for any reformulation to meet these proposed levels as well as product testing will require a minimum of two years.

Sincerely, Mike Zink;Chemist

OKON Inc.
4725 Leyden St.
Denver, CO 80216
303 377-7800

Comment Letter #8 –

March 26, 2014

Dan Russell
Air Quality Specialist
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, CA 91765

Re: Proposed Amended Rule 1113

Dear Mr. Russell:

8-1 This letter is to provide comments by Rust-Oleum Corporation and The Flecto Company on the Proposed Amended Rule 1113. It is our understanding that this Amended Rule will be offered to the Board for adoption on November 7, 2003. We respectfully request that the submission of the Amended Rule, or in the alternative, the Board's evaluation and decision on the Amended Rule be postponed for a period of 90 days beyond the November 7 date. We believe that within the next 90 days meaningful testing can be conducted to demonstrate the adverse effect the Proposed Amended Rule would have on clear wood coatings and stains; testing which can assist the staff in developing an effective Amended Rule with achievable limits.

The following is a list of performance testing that manufacturers of clear coatings and stains use to evaluate products:

Clear Wood Finishes:
Products claiming flooring benefits
- Taber abrasion
- Hoffman and Pencil scratch
- Impact resistance
- Chemical resistance-Maple Flooring and KCMA

Clear Wood Finishes:
Products claiming furniture, cabinets, trim benefits
- Hoffman and Pencil scratch
- Impact resistance
- Chemical resistance-KCMA

Wood Finish Stains Interior Low Solids:
- Dry time on pine, oak and popular
- Lapping
- Topcoatability
- Brushability

Spray
Grain raise

Wood Finish Stains Interior High Solids:
Dry time on pine, oak, popular
Lapping
Topcoatability
Brushability
Spray
Grain raise

Wood Finish Stains Exterior:
Exterior weathering
Mildew testing
Crack and peel
Application in high humidity and low temperature

8-2 The testing by the Master Paint Institute is directed at the physical characteristics of the coatings such as weight per gallon, not the performance characteristics. A clear wood coating may be developed and manufactured to meet the proposed VOC standard of 275 g/l, but that does not mean that it will perform as an effective coating. A clear floor coating at 275 g/l may even look good, but it may not hold up to normal abrasion or repel chemicals such as mustard, alcohol and cleaning products such as Windex. A stain at 250 g/l may look OK when first applied, but if it is not applied by professional applicators there will be grain raising of the wood and/or lapping of the stain in most consumer applications. These failures can only be corrected by sanding and refinishing the surface, resulting in additional applications of "low VOC" stains. Performance testing, as stated above, should first be conducted for clear wood coatings formulated at less than 275 g/l and stains at less than 100 g/l before these numbers are put in the Rule. It should be very easy to test the performance of those products which the staff used to develop the proposed lower VOC levels, if we are provided samples of the products.

8-3 Another area of concern we have with the Proposed Amended is the proposal to eliminate the quart exemption for clear wood finishes. Small size containers of clear coatings are more likely to be used to coat non-architectural objects such as wood chairs, tables and other furniture. Rule 1113 does not include coatings used on non-architectural surfaces. Consumers are not likely to purchase clear coatings in small containers to coat floors, wood trim and doors, the more likely architectural coating applications. Small size containers are also purchased for and used for touchup of scratched and marred surfaces. A water-based low VOC clear coating can not be used to touchup factory clear-coated surfaces. There are adhesion problems between water-based touchup coatings and oil based finishes. Also, the water-based clear does not match the oil based clear. Oil based clear coats add a richer yellow tint to the surface which does not occur with water-based clear coats.

8-4 A further area of concern with respect to the category of clear wood finishes are the references in the staff report to exempt solvents and alternative coatings. The use of acetone or methyl acetate in the consumer products is of paramount concern with respect to flammability and handling. The use of two component systems such as isocyanate or polyester methyl ethyl ketone peroxide cure are far too dangerous or toxic for consumers to handle. The substitution of

8-4 current clear wood coatings and stains with alternative products containing exempt solvents or low VOC water-based products would effectively remove these products from retail shelves due to their toxicity or application limitations. Only professional contractors should apply these products.

8-5 Contrary to the statement on page VI-1 under Cost and Cost Effectiveness, the proposed VOC limits for clear wood coatings and stains **<u>are</u>** "technology forcing." Raw material costs for new water-based products are twice as costly as raw materials used in nationally compliant products. We do not know the source of the staff's "Future Costs" in the table on page VI-1, but these costs do not represent the practical average future cost for coatings and stains formulated to meet the proposed lower VOC limits. The future costs should be based on the costs for clear coatings and stains that not only meet the proposed VOC levels, but also meet the performance requirements of consumers. If a low VOC coating or stain does not perform to customer requirements, the costs to repair and recoat should be added to Future Costs.

8-6 For the above reasons Rust-Oleum Corporation and The Flecto Company respectfully request that the voting by the Board on the Proposed Amended Rule 1113 be postponed for 90 days. In the alternative we ask that the staff reconsider the proposed 2005 VOC levels and leave in the current small size exemption for clear wood coatings.

Sincerely,

Michael T. Murphy
Corporate Counsel

Comment Letter #9 –

COMMENTS ON PAR 1113

Submitted on Behalf of
The Sherwin-Williams Company
September 12, 2003

These comments are submitted on behalf of The Sherwin-Williams Company (Sherwin-Williams) regarding Proposed Amended Rule (PAR) 1113-Architectural Coatings and Proposed Amended Rule (PAR) 1171-Solvent Cleaning Operations. As I mentioned at the workshop on September 4, Madelyn Harding has been out of the country. She will be returning on September 15 and will review these comments upon her return. She has not participated in their preparation, and thus may have additional comments. We will forward those to you as soon as possible.

I. PAR 1113

A. The Proposed Clear Wood Finish Limit of 275 g/L, Coupled with the Proposed Elimination of the Small Container Exemption, Would Effectively Ban Traditional Varnishes.

9-1 Elimination of traditional varnishes is not something that should be done casually, because the fact that these products are often preferred over their waterborne alternatives tells us that the lower-VOC products do not provide the performance, handling or appearance characteristics needed in many applications.

9-2 The sales data for varnishes clearly shows that solvent-based formulations are preferred, even when the trend in nearly every other category is toward water-based coatings. The small container exemption was put in the rule to provide a safety valve mechanism to assure that certain coatings would be available to consumers to fill specific needs. The District proposal would have the effect of removing from the market the nearly half (if not more than half) of varnishes that consumers are currently purchasing. This estimate is difficult to make because of the way the District has formatted the data provided in the staff report. Rather than showing quantities of coatings sold based on VOC contents above and below the proposed limit, a sales weighted average VOC is provided for the total gallonage. Further complicating matters is the inclusion of sanding sealers and lacquers along with varnish for small container data, but excluding those products in the large container data. However, based on the high sales weighted average VOC content of coatings in small containers, and the fact that the sales weighted average of varnishes in larger containers also exceeds the proposed limit, it is clear that a large quantity of the coatings currently being used by consumers will no longer be available.

9-3 What will those coatings be replaced with? There is nothing in the information provided so far by SCAQMD staff that indicates that the remaining compliant coatings will be able to adequately replace those being banned. For example none of the exterior varnishes listed in Appendix A meet the proposed limit. Additionally, as we stated at the September 4 workshop, a number of the coatings listed in Appendix A under clear wood finishes are NOT varnishes or

suitable replacements for varnishes. These are Behr's Deck Plus Wood Toned Waterproofing
Wood Finish, Benjamin Moore's 2 component Epoxy Coating Clear (which is an IM coating),
Sherwin Williams Cuprinol Deck and Siding Wood Finish, JFB Hart Coatings HP-146 and HP-
9-3 105, and Silvertown Products Rhinoguard Wood Defense.

The staff proposal will leave huge gaps in the marketplace where previously available and needed coatings will no longer be available. This will lead to the use of unsuitable coatings, consumer complaints, and the need for stripping, refinishing, and repainting. When complaints are made, it is the retailer who bears the brunt of the complaints – not the District.

The small container exemption for varnishes needs to be retained.

B. The Staff Report Consolidates Emissions From Small Container Sales of Varnishes, Lacquers and Sanding Sealers, Which Prevents Meaningful Discussion of Alternatives to Elimination of the Exemption.

9-4 Varnishes, lacquers and sanding sealers have inherently large differences in VOC content requirements. They should be viewed as distinct subcategories in the rulemaking process, not lumped together as if they were fungible. Without knowledge of the sales volume and actual VOC content for each product type sold in small containers, it is not possible to offer alternative proposals based on actual emissions. We respectfully request that the District provide this information. This will enable us to determine whether an alternative proposal can be developed.

C. The Proposed Limit of 100 g/L Would Render Exterior Stains for Horizontal, Trafficked Surfaces Unfit for Their Intended Purpose.

The proposed limit of 100 grams per liter for stains does not take into consideration the
different performance needs for vertical surfaces and horizontal, trafficked surfaces (e.g., decks).
9-5 Surfaces that will be subjected to abrasion (e.g., foot traffic) need a relatively high T_g resin, and
the 100 g/l limit will not allow enough coalescing solvent in the formula to achieve proper film formation of a higher T_g waterborne polymer. There should be an additional category for stains recommended for use on horizontal, trafficked surfaces such as decks, with a VOC limit of 250 g/l. This need can also be discerned by reviewing the list of stains contained in Appendix A. Most of the stains in the list with VOCs over 150 grams/liter are formulated for application to decks (although they can also be used for vertical surfaces).

Unfortunately, the list of stains contained in Appendix A does not contain other critically
important information. It does not identify stains as semitransparent or opaque, high-solids or
low-solids; it mixes stains designed for wood finishing with stains for concrete, stucco and
9-6 masonry, and it contains no information regarding whether the low-VOC stains identified in the
document meet the application, handling and performance requirements for all essential applications.

Additionally, we cannot support lowering the VOC limit for interior, low solids stains to
9-7 50 grams/liter. As we have previously stated in other rulemaking proceedings in the South Coast
and elsewhere, use of water based stains on interior wood surfaces creates significant problems. On large surface areas, lapping is a definite problem. Grain raising is also a problem with water

9-7 based stains. These problems can lead to unacceptable finishes and significant rework. These problems are exacerbated with low-solids water based stains.

D. The Implementation Schedule for PAR 1113 Allows Approximately 12 Months from Board Approval to Effective Date, An Inadequate Timeframe for Product Development, Testing and Scaleup.

9-8 The staff proposal provides insufficient time to complete the cycle of critical steps for launch of a new or reformulated product. Staff apparently is gambling that the coatings it has identified will work in all possible situations demanded by the market. Yet there is no explanation in the staff report as to why the available low-VOC materials have not dominated the marketplace and displaced higher VOC products, if in fact, they can do the job. The obvious answer is that they do not possess the essential characteristics needed for many (if not most) applications. This issue needs to be addressed first, and not through product bans that force people to use alternatives that may or may not work. It is the District's burden to demonstrate that these replacement products are fit for all essential uses by means of good science, not wishful thinking.

II. PAR 1171

9-9 The proposed amendments to Rule 1171 need to have an exemption from the 25 gram/liter equipment cleaning solvent limit for cleaning equipment used for applying coatings where the chemistry is incompatible with the use of the 25 gram/liter solvents.

Comment Letter #10a –

September 11, 2003

Via E-mail and UPS Next Day Air

Mr. Barry Wallerstein, Executive Officer
Ms. Elaine Chang, Deputy Executive Officer of Planning & Rule Development
Ms. Lee Lockie, Director for Area Sources
Mr. Dan Russell, Air Quality Specialist
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, CA 91765

E-mail: bwallerstein@aqmd.gov, echang@aqmd.gov, llockie@aqmd.gov, drussell@aqmd.gov

RE: Rule 1113 Amendments
Waterproofing Sealer – Concrete/Masonry Coatings

Gentlemen and Ladies:

10-1 Textured Coatings of America, Inc. (hereinafter "TCA") is a small national paint and coatings manufacturer having factories in California and Florida. TCA is beginning its 43rd year in business as a company and has previously had to deal with continued VOC regulations of this industry. I am president and CEO of TCA and personally attended workshops that were held regarding Rule 1113. TCA manufactures products that are designated as Concrete/Masonry Waterproofing Sealers. The proposed amendments are so important that we have attended every meeting in person, as well as teleconferenced in from our offices located in Florida. Kevin Worrall, chief chemist for TCA, submitted comments at the July 16, 2003 workshop which took place prior to the release of the amended rule; however Dan Russell informed him at the August workshop that the staff did not have the time to review the data we supplied. It is truly amazing that rulemaking can proceed without the staff reviewing and understanding the information that industry has presented them.

10-2 The proposed amendments to Rule 1113 will virtually eliminate the specialty coatings categories for waterproofing sealers. When Rule 1113 was amended in 1999, South Coast Air Quality Management District (SCAQMD) created the category, Waterproofing/Concrete Masonry Sealers, with a VOC level of 400 grams per liter, for specialty waterproofing sealers made for concrete and masonry coatings. I was personally involved in the creation of the category with the aide of former SCAQMD member Hal Bernson, as well as Barry Wallerstein. The idea was to lower the general category of Waterproofing Sealers, which encompasses the major volume of products, but would allow specialty niche products to survive. They understood there was a difference in the performance and longevity of these specialty products, and a need for these coatings to exist. This includes not only the non-film forming silanes and siloxanes, but also the film-forming product my company manufactures, XL 70®. These materials meet rigorous

testing required by the National Cooperative Highway Research Program, which mandates
performance testing required for protecting the concrete. We have looked at most the coatings
included in the Appendix A to the modified rule, and the technical data for these zero or low
10-2 VOC products listed under waterproofing concrete/masonry sealers do not show these tests being
performed. The proposed amendment disregards South Coast's 1999 rule and the reasons for
creating this specialty category. This will result in the elimination of the bulk majority of
specialty products.

When the 1999 rule was created for Waterproofing Concrete/Masonry Sealers, both film forming
and non-film forming products were highlighted in the definition. The products listed in
Appendix A of the proposed rule show no non-film forming products under 250 grams per liter.
Indeed, we question these numbers. We have spoken with some of our competitors, who are
10-3 basic in the non-film forming waterproofing concrete masonry sealers, which consist mainly of
silanes and siloxanes. These competitors, such as Enviroseal and Sivento are in agreement, even
waterbased silanes and siloxanes test at 315 to 380 grams per liter when tested according to EPA
Method 24. We have to ask where the analysis in the proposed Rule 1113 (November 2003) was
derived, when the major manufacturers, Degussa, Wacker and Dow all show their waterbased
silanes and siloxanes are in the 315 to 380 grams per liter range.

Many of the materials on the list provided by SCAQMD's current draft rule are not
waterproofing sealers, but are damp proofing materials or simply clear acrylic sealers or
coatings, which will not meet the stringent testing required of waterproofing materials. The term
'waterproofing' is widely used, often improperly. We investigated the pigmented materials listed
as waterproofing sealers, and found they all required primers, which when looked at as a
completed system, in many cases emit more VOCs than the primerless products, such as XL70®,
more fully discussed below. XL-70® is a primer-less concrete protective coating that has a
proven lifespan of over twenty years protecting bridge abutments, medians and other concrete
surfaces, such as commercial buildings. The XL-70® meets very restrictive waterproofing
10-4 testing, and protects the concrete over a long time period. The use of this low volume coating
saves time, labor and materials in comparison to a waterborne coating. These are just some of
the factors that were instrumental in the development of the Waterproofing/Concrete Masonry
Sealer Category. The coating technology used in XL-70® is a vinyl toluene acrylic copolymer,
requires a certain amount of solvent as the carrier to yield a high performance concrete coating
with superior weathering capabilities. As bridges and other concrete structures weather, they are
exposed to salt spray and chloride ion intrusion. In addition, rusting rebar causes severe building
and bridge damage. Carbonation, the ability of excess carbon dioxide permeating into concrete
lowers the pH of the concrete, which causes the environment around the rebar to become more
acidic. This allows corrosion of the rebar, contributing to premature failure of the structure. The
XL-70® Bridge Cote Concrete Protective Coating protects the concrete against these factors, as
well as ultraviolet rays, rain, and numerous other factors which erode concrete.

Our country as a whole is experiencing severe problems with deteriorating concrete. We will
spend billions of dollars replacing spalling concrete and rusting rebar. Much of this could be
10-5 avoided with the use of one of the protective coatings such as the Silane and Siloxane and
XL70® products discussed above. Listed below are some of the tests that XL-70® Bridge-Cote®
must pass, documented by independent laboratories, in order for the product to be specified by
states, DOT's, military and architects.

Federal Specification TTC-555B – Pass all requirements
98 Miles Per Hour Wind Driven Rain – Pass (24 hours)
Percents solids (wt.) –73.6% typical
Alkali Resistance – 5% solution sodium hydroxide in water at 120^{o}F for 16 hours – Pass
Moisture Vapor Permeability ASTM E96 – 5.2 and 6.0 Perms – Pass
Weatherometer
(a) Color Uniformity 400 hours – Pass
10-5 (b) No chipping or peeling for 8603 hours – Pass (Equivalent to 24 years California weather)
Freeze-Thaw, 400.15.26.7(a) – 50 cycles, minimum – Pass
Salt Spray Resistance, ASTM B117 – 300 hours, minimum – Pass
Abrasion Test, ASTM D968-81, Falling Sand, 2000 liters – Pass

While the volume of our coating sold is not large, the coating is valuable in that it can be applied to wet, green concrete, as well as older surfaces without the use of a primer. Also, the typical lifespan of acrylic coatings is less than five years, resulting in re-coating two to three times over the lifespan of the XL-70®.

10-6 In conclusion, keeping the higher limits for this specialty sub-category for concrete is consistent with the CARB Rule and is necessary to provide local, state and federal departments of transportation with these long-term performance products. The coatings we manufacture are specified by Departments of Transportation nationwide for the protection of concrete bridges due to the proven performance and low maintenance properties of the coatings. While we anticipate moderate growth in sales in this coating category, this category is a unique specialty coatings category that will not allow other products to be utilized within these categories to escape lower VOC requirements.

10-7 We respectfully request that you continue to keep the Waterproofing/Concrete Masonry Sealers as a separate category at 400 grams/liter. These are very unique coating categories that will never represent large volume emissions of volatile organic content within your region. Based on the correct products that fall into this category they represent a minuscule amount of VOCs and therefore reducing and or eliminating this category for the above mentioned products would NOT result in any real emission reductions for the South Coast Air Quality Management District. Indeed, with the proposed Rule 1171, the SIP standards for reduction in VOCs have been met for the SCAQMD. The lowering of the limits of this specialty coating category is placing undue hardship not only on the manufacturers, but on the building owners as well.

10-8 Please contact me regarding any additional information necessary to have this category included in the Rule 1113 Amendment. I would appreciate South Coast informing Textured Coatings of America, Inc. of whether you intend to include this subcategory in the amended Rule 1113. If this specialty category is eliminated, and when the changes go into effect January 2005, it will result in the elimination of our entire product line and we will be forced to close our factory, resulting in a further loss of jobs in California.

Your favorable consideration of our request is appreciated.

Sincerely,

Jay A. Haines
President/CEO

JAH/sam

cc: Jim Sell, National Paint and Coatings Association

Comment Letter #10b –

September 15, 2003

Mr. Barry Wallerstein, Executive Officer
Ms. Elaine Chang, Deputy Executive Officer of Planning & Rule Development
Ms. Lee Lockie, Director for Area Sources
Mr. Dan Russell, Air Quality Specialist
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, California 91765

E-mail: bwallerstein@aqmd.gov, echang@aqmd.gov, llockie@aqmd.gov, drussell@aqmd.gov

RE: Rule 1113 Amendments Comments
Waterproofing Concrete/Masonry Sealers Category

Gentlemen & Ladies:

10b-1 This letter is written to correct an error in our letter of comments we sent to you September 11, 2003. Reference was made to Hal Bernson and Barry Wallerstein as being involved with Textured Coatings of America, Inc., in the creation of the special category, Waterproofing/Concrete Masonry Sealers, containing a VOC level of 400 grams per liter. This statement contained a typographical error. The person involved from South Coast Air Quality Management District was Jack Broadbent. At no time was Hal Bernson ever involved with Textured Coatings of America, Inc. in the creation of this category or any other category or their definitions. To further clarify the matter, enclosed is a letter dated May 5, 1999 from Jack Broadbent regarding this category.

Please accept my apology for any inconvenience this error might have caused and feel free to contact me at (850) 769-0347, extension 248, if you have any questions.

Sincerely,

Jay A. Haines
President/CEO

JAH:sam

Enclosure

cc: Hal Bernson

Comment Letter #11 –

August 13, 2003

Dave DeBoer
c/o CEQA
South Coast Air Quality Management District
21865 East Copley Drive
Diamond Bar, California 91765

Re: PAR 1113

Mr. DeBoer:

11-1 I am writing to you today to provide comments and suggest changes to the proposed amendments for Rule 1113: Architectural Coatings. Tnemec recognizes the importance of reducing the emissions of VOCs for reduction of air pollution in southern California. It is our desire to work with the staff to develop a rule with reasonable VOC limits based on technically feasible and field-proven technology. Tnemec has worked very hard over the last few years to assess the impact of the proposed Rule 1113 on our business and develop new products that will meet its requirements. It is important for the staff to recognize that the impact of this rule for Tnemec is very far-reaching and, to date has resulted in the development of several new products. As a company, we must continue to try and gain market acceptance and develop the long term test data that is expected for high performance industrial maintenance coatings. Over the course of this eight-month period of the interim limits, we have found some issues regarding Rule 1113. We offer the following comments and suggestions to change PAR 1113 to support what we believe are reasonable VOC limits based on proven available technology.

We have two topics for discussion and commentary:

11-2 **1. Field Touch-Up of Prefabricated Architectural Components**

The SCAQMD Rule 1113 has specific jurisdiction over coatings that are field applied. The SCAQMD Rule 1107 has the jurisdiction over shop application of coatings. These rules do not have the same restrictions placed on VOC content of prefabricated architectural component coatings. Rule 1113 restricts the VOC of these coatings to 250 g/L and Rule 1107 sets the limit at 420 g/L. These differences in the rules create some problems:

One problem has to do with how the coatings are specified. When a specification is written for a high performance coating system, you have specific requirements for performance of the coating system. The differences in these rules create a problem of not being able to utilize the same system for field touch-up and repair of prefabricated architectural components. This will require specifying different products for the shop and field applications. This makes the specifications overly complicated; and more expensive to create and maintain. It could also require the use of a field-applied compliant primer for prefabricated architectural components.

This in effect creates a domino effect of the Rule 1113 regulatory impact and places additional restrictions on coating applications that are not supposed to be governed by Rule 1113. It is not fair for Rule 1113 to affect shop-applied coatings when Rule 1107 was designed for that purpose. This domino effect is widespread and affecting shop applications in other districts and states as well.

Many of the prefabricated architectural components require field touch-up of bolted connections. Engineering guidelines require that any coating applied between bolted connections be tested in accordance with AISC method for slip coefficient. For applications where an AISC coating is not specified, these bolted connections are left unprimed and require field touch-up.

We do recognize that Rule 1113 has a quart exemption rule, but this is not an adequate solution for the problem. While the field touch-up is limited to small quantities of coating, quarts are not a feasible method of mixing and applying the high performance architectural primers. For airless spray application, you need at least one gallon of material for an application. Usually two quarts of this material is used for priming the pump, hoses and manifold filter.

11-2 The amount of primer material used on these types of jobs is typically limited to small quantities. We usually see the usage of about 5-10% of material for field touch-up at typical size construction projects. When considering the fact that most exterior-exposed structural steel coating specifications include field-applied intermediate and topcoats, the small quantity of field touch-up primer used represents an insignificant contribution to VOC emissions for the overall project.

Rule 1113 has several specialty primer product categories, none of which address corrosion protection primers for structural steel. In addition to the corrosion protection of the steel, these primers can also be certified by UL for use as primers for fireproofing materials and by NSF for contact with potable water.

We believe there is a need to create an exemption for prefabricated architectural component primers. This would acknowledge that Rule 1113 does not have authority over shop-applied coatings. The exemption should allow the use of coatings that meet the applicable shop rule for field touch-up and the coating of bolted structural connections. The exemption should not require the product be supplied in quarts.

An alternative to the above solution is to create a category for Prefabricated Architectural Components as a subcategory of the Industrial Maintenance category. This category should have a VOC limit of 340 g/L. As indicated, the amount of VOC contributed by these products is insignificant.

2. Extreme Durability Coatings

We feel there should be an additional coatings category definition added to allow the use of air-dried fluoropolymer-based coatings. These high performance finishes are designed to provide extended color and gloss retention in critical areas, eliminating the need for multiple coating applications over time.

11-3 At a proposed VOC level of 400 grams per liter, these products will actually reduce the total VOC released over the lifetime of high profile architectural structures. These fluoropolymer-based coatings are typically used for field touch-up , repair, and overcoating of aged Kynar 500 shop-applied coatings that require force curing at 400˚F and new construction projects.

We propose the following new category definition be added to Rule 1113:

Extreme Durability Coating – An air-dried coating, including fluoropolymer-based coating, that is formulated and recommended for application to exterior metal surfaces, touch-up, repair and overcoating of precoated metal surfaces. This will meet the weathering requirements of American Architectural Manufacturers Association (AAMA) specification 605-98 – Voluntary Specification Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.

11-4 The Federal EPA has recognized the need for these types of coatings during development of the National Volatile Organic Compound Emission Standards for Architectural Coatings (National AIM VOC Rule).

11-4 The definition for extreme durability coatings in the National AIM VOC Rule is similar to the above proposed definition. The VOC limits for the extreme durability coating category in the National AIM Rule have been set at 800 grams per liter. The SCAQMD has recognized the benefits of fluoropolymer coating with their inclusion in their Rule 1107 a category titled "High Performance Architectural Coating." Both of these categories are based on Kynar-type products that are a baked-on finish. New technology has become available that provides air-dried coatings that are equivalent for color and gloss retention. Air-dried coatings of this type are available that do not exceed 400 grams per liter as applied, which is consistent with our recommendation.

Tnemec appreciates the opportunity to work with the staff on reasonable VOC limits based on proven available technology. Please let me know if you have any questions or if we can provide additional information. Thank you for your consideration of these comments.

Regards,

TNEMEC CO. INC.

Kyle R. Frakes
R&D Coordinator

KRF03038:omb

Comment Letter #12 - BonaX

September 3, 2003

Mr. Dan Russell
Planning, Rule Development and Area Sources
SCAQMD
21865 E. Copley Drive
Diamond Bar, CA 91765

Re: Proposed Amended Rule 1113 -Architectural Coatings dated August 15, 2003

Dear Mr. Russell:

Bonakemi USA, Inc. is pleased to have the opportunity to participate and comment on the Proposed Amended Rule 1113 -Architectural Coatings dated August 15, 2003.

BonaKemi USA, Inc. ("Bona") is a subsidiary of BonaKemi AB, located in Malmö, Sweden. Bona is the market leader in the U.S. for waterborne technology of clear topcoats used in the hardwood flooring industry. We also manufacture a line of high- performing solvent-based products for hardwood flooring. Amongst the products we manufacture are semi-transparent stains, sanding sealers, quick-dry sealers, gym floor paints and varnishes, all of which are regulated under Rule 1113.

Bona recognizes that lower-VOC products are desirable from both a health and environmental standpoint. As for the overall impact on the environment, we also agree in principle to the draft PAR 1113 analysis of impact on emissions reductions.

We wish to comment on two aspects of the Proposed Rule: 1) Reduction of the VOC limit for the Clear Wood Finish category from 350 g/L to 275 g/L., and 2) Elimination of the Quart Exemption.

12-1 Clear Wood Finish Category. [Table of Standards] Bona supports the reduction in the VOC limit for this category of architectural coatings. The technology to produce durable, high-performance clear wood finishes has existed for over a decade. Bona's two highest volume products in this category are actually under 250 g/L VOC. Both are waterborne urethane Varnishes designed for residential and commercial traffic. Both out-perform premium solvent-based Oil Modified Urethane-type finishes, including Bona's own brand.

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12-2 One ostensibly legitimate reason for maintaining the higher VOC limit relates not to technology, but to aesthetics. Arguments have been made that the lower-VOC waterborne finishes do not supply the "depth" or "richness" (color) to floors, moldings or other coated wood surfaces. However, this objection is easily overcome. The use of a natural stain under the finish produces the same effect. Lower emission of VOCs is still achieved utilizing this approach. Typical coatings systems for wood flooring consist of either two coats of solventbased finish over a stain or solventbased sealer, or three coats of finish. Use of a <275 g/L topcoat results in a dramatic decrease in emissions as at least two of the applied coats are lower in VOC. Additionally stains are typically applied at much higher coverage rates than finishes (800 - 1000 sq. ft./gallon vs. 500 sq. ft./gallon), so less product is applied with correspondingly reduced emissions. Emissions are further reduced using waterborne products, because they eliminate the need to tack with solvent between applications of finish, and application tools are cleaned with water rather than solvent.

12-3 In truth, with support from the market, manufacturers would have no problem completely supplanting higher-VOC products with lower-VOC product formulations for the Clear Wood Coatings category. Unfortunately, the market continues to be influenced by Professional Contractors (and to a certain extent by the homeowner "DIY" user) who drive the demand for higher solvent-based products. There are three reasons for this. First, users of Clear Wood Finish products cling to the misguided perception that waterborne finishes are less durable than solvent-based finishes. Years of independent lab and field testing contradict this widely-held belief. Progress in changing this attitude continues as more users see the results through ongoing educational efforts by manufacturers such as Bona.

Secondly, waterborne products do <u>initially</u> cost more than their solvent-based counterparts, based on material cost. However, die reduced dry-time of waterborne products allows die user to complete more jobs in less time—two days as opposed to three in most cases. Importantly, the consumer does not have to incur outside housing expenses, and businesses suffer less downtime while the work is being done. Thus, from an overall job cost analysis, contractors can potentially make more money, and the total expense to the consumer is actually less when all costs are considered

12-4 Thirdly, the application methods for waterborne products are somewhat different and require different application tools than those used for solvent-based products. The resistance to learning new skills may be understandable, but it can certainly be overcome with only a modicum of training. One-day schools are presented throughout the country and throughout the year by several industry organizations (National Wood Flooring Association, National Oak Flooring Manufacturers Association) as well as traveling demonstrations hosted by Bona and other manufacturers. Our in-house training experience supports that this resistance to change and learning alternate skills is also an issue of habit. Contractors who start their careers using waterborne products, and are then forced to use solventbased products (e.g., to meet an architect specification) cannot understand why anyone would prefer to use solventbased products. They realize the benefits that waterborne products provide.

In any event, these same three objections were made when paint contractors were switching from solventbased enamels to waterborne latex emulsions, and the paint market is now dominated by products in the latter category.

12-5 <u>Elimination of Quart Exemption.</u> [(g)(l)(A)] Bona also supports <u>elimination</u> of the quart exemption for the categories of Clear Wood Finishes and Sanding Sealers. The same arguments for the use of lower-VOC products above apply here as well. The use of four quart containers results in the same, if not more, VOC emissions as one gallon. Furthermore, the practice of emptying multiple quarts of product into a five-gallon pail (which is necessitated because large application tools cannot fit into a quart-sized container) defeats the purpose and intent of the quart exemption. While the quart exemption is still

12-5 appropriate for small volume coatings such as stains, graphic art paints, etc., it is not justified for these categories.

We appreciate your consideration of these comments, and we look forward to participating in this ongoing process.

Yours very truly,

Gerald E. Thompson
Director of R&D/QC/Regulatory Compliance
BonaKemi USA, Inc.

1-1 Based on several comments received from the commentators regarding adequate time to reformulate and commercialize a product, staff has revised the proposed implementation date from January 1, 2005 to July 1, 2006 for clear wood finishing, water proofing sealers, waterproofing concrete/masonry sealers, and stains. While staff has included an extensive list of products in Appendix A that already comply with the proposed limits, the revised proposal provides over 30 months to companies that do not have compliant products for reformulation and commercial introduction.

1-2 Additional evaluation of the "Low Solids Interior Stains" and "Low Solids Waterproofing Sealers" categories indicates that the overall volume of products that meet the low solids definition is low, and therefore the emission reduction benefits using the current data is low and does not warrant a change. Staff has revised its proposal to remove all specialty low-solids definitions and retain the low-solids coating category with a VOC limit (material) of 120 g/l.

1-3 Staff recognizes your support for a VOC limit of 275 g/l for clear wood coatings, including varnishes. Staff also appreciates your comments regarding the small container exemption, but disagrees that adequate substitute products are not available for varnishes. Appendix A lists numerous clear wood coatings that comply with the proposed limit, which are also available in small containers. Therefore, staff is proposing to delete the small container exemption for clear wood coatings, effective July 1, 2006. However, in response to your comment, staff is also considering an alternate proposal that phases out the exemption and in the interim establish maximum VOC limits for coatings in those small containers. Specifically, exemption would be deleted effective July 1, 2008 and in the interim, the maximum VOC limit for varnishes and sanding sealers sold in small containers will be 450 g/l, and 550 g/l for lacquers.

1-4 Staff has conducted an extensive technology assessment and concluded that numerous, well performing products are available and in use that comply with the proposed VOC limit of 50 g/l. The proposed implementation date is January 1, 2005. However, staff has also created a new category for Aluminum Roof Coatings and proposed a VOC limit of 100 g/l, effective January 1, 2005. Lastly, for roof coatings that have a Energy Star certification and have a VOC content of 100 g/l or less, the proposed implementation date is January 1, 2007.

1-5 Staff appreciates your supporting comment regarding the technical feasibility of reformulating opaque and solid color stains intended for both horizontal and vertical surfaces at the proposed VOC limit of 100 g/l. The staff has revised the implementation date to July 1, 2007. For other types of stains, including clears, toners, and semi-transparent, staff has included numerous products in Appendix A that comply with the proposed limit of 100 g/l. Additionally, the AVES study, as well as information from KCMA, indicates that clear and semi-transparent stains, as well as toners, that comply with the proposed VOC limit of 100 g/l can be formulated, and are commercially available and used. Splitting the category into vertical vs. horizontal uses is not feasible since it could exacerbate the potential substitution of a lower-VOC stain with a higher-VOC stain, and cause enforceability issues.

1-6 Numerous manufacturers with clear and semi-transparent stains are included in Appendix A, including non-opaque stains. The manufacturers of these stains indicate that they do not have issues related to lapping and open time. The AVES Study evaluated the open time and lapping characteristics of low-VOC stains with higher-VOC solvent-based stains and concluded that the lower-VOC formulation applied without any problems, resulting in a good quality finish.

1-7 Staff appreciates your comments regarding non-opaque stains, intended for vertical and horizontal surfaces. The proposed compliance date for stains, including non-opaque stains, has been revised to July 1, 2007, providing for sufficient time to reformulate, field test, and conduct weathering studies. This extension of the implementation date is supported by the NPCA comment letter, comment #6-7.

1-8 Staff has revised the proposed VOC limit for waterproofing sealers from 50 g/l to 100 g/l. Additionally, the implementation date has been revised from January 1, 2005 to July 1, 2006, providing for sufficient time to reformulate and conduct one to two years of accelerated weathering, wear testing., and any other testing prior to commercialization.

1-9 Staff has revised the implementation date for waterproofing concrete/masonry sealers from January 1, 2005 to July 1, 2006, an additional six months beyond your requested implementation date. Additionally, the proposed VOC limit for this category has been revised from 50 g/l to 100 g/l.

1-10 Staff appreciates your comments and concerns regarding the implementation dates, and has revised its original proposal, extending the proposed implementation dates by an additional 18 months, which provides the time necessary to reformulate, conduct accelerated field testing, as well as actual field testing prior to commercializing a product.

2-1 While staff appreciates your comments regarding the implementation date, as well as the time necessary for research and development, laboratory- and field-testing, long term exterior exposure studies, and revision of labels and product literature, staff disagrees with your recommended implementation date of January 1, 2008. However, staff has revised the proposed implementation date from January 1, 2005 to July 1, 2006 for clear wood coatings, waterproofing sealers, waterproofing concrete/masonry sealers, and July 1, 2007 for stains. These dates are warranted due to the large amount of coatings that already meet our proposed limits and are commercially available today. The staff report includes a table that summarizes the market penetration of the proposed limits for each coating category, as of sales in the year 2000. This revision results in more than 30 – 42 months for research and development, laboratory- and field-testing, long term exterior exposure studies, and revision of labels and product literature. This revised schedule is well supported by other commentators, including comments included in Comment Letter #1 and Comment Letter #6.

2-2 Staff agrees that the small container exemption may be necessary for some niche products. Staff also appreciates your past correspondence regarding this issue. Staff recognizes that sanding sealers and varnishes represent a large percentage of the overall volume of sales in small containers. Staff's research shows that the main reason for these coatings sold in small containers is for small projects, and that the products listed in Appendix A are all adequate replacements for their higher-VOC counterparts currently sold in small containers. However, staff has revised the implementation date for removing the small container exemption to July 1, 2006. In response to comments, staff is also considering an alternate proposal that phases out the exemption and in the interim establish maximum VOC limits for coatings in those small containers. Specifically, the exemption would be deleted effective July 1, 2008 and in the interim, the maximum VOC limit for varnishes and sanding sealers sold in small containers will be 450 g/l, and 550 g/l for lacquers. Furthermore, the AVES Study clearly illustrates the ability of the low VOC varnishes, sanding sealers, and lacquers to replace existing high VOC products for initial coating, as well as touch-up and repair.

2-3 Staff appreciates the comments regarding 'reactivity', as well as a simplistic comparison of overall ozone potential from solvent-based formulations compared to waterborne formulations. However, as indicated in the staff report and the existing rule language, the AQMD recognizes the potential of reactivity as an alternative ozone control strategy, as well as recognizes the limitations of currently available data on MIR values, mainly the uncertainty associated with the current data, as published in numerous reports by the experts in the field, namely Dr. William Carter, CE-CERT. Additionally, recognizing the recent construction of a state-of-the art chamber at the CE-CERT facility at University of California, Riverside, as well as the AQMD's on-going support of this concept, the AQMD has contracted with CE-CERT to further study the reactivity and availability of VOC species most commonly found in waterborne and solvent-based coatings. The scope of the project will focus on assessing the reactivity of VOC species most commonly found in solvent-based and waterborne architectural coatings, including studying ozone reactivities of low volatility solvents and re-evaluating uncertainties resulting from current data and modeling. The AQMD project will further explore the potential of the new environmental chamber to investigate availability of the low volatility solvents and coordinate the studies with other availability studies. CARB has a limited pilot program in their Aerosol Coatings rule that allows the use of reactivity, because of the uncertainties associated with the reactivity-based approach, they do not support to expand its use as an alternative approach in the Suggested Control Measure for Architectural Coatings at this time. Therefore, CARB has also contracted with CE-CERT to conduct additional studies in an effort to reduce the uncertainty of MIR values. Both the AQMD and CARB contracts include additional analyses for the very solvent species highlighted in the comment letter. Therefore, it is not prudent to analyze the ozone-forming potential based on currently available MIR data. Until adequate, peer-reviewed data is available on the MIR values of these solvent species, especially from the newly-constructed chamber, the mass-based approach continues to be the only proven ozone control strategy. Staff disagrees that having a lower VOC limit for stains, varnishes, and sanding sealers would be counterproductive to the air quality goal of ozone reduction. Lowering the overall volume of solvent from solvent-based formulations to waterborne formulations will continue to lower the VOC limits, and thereby reducing the ozone formation. The MIR values are also dependant on scenario conditions, such as NOx availability. Furthermore, averaging the MIRs of the compounds found in finishes is not the appropriate approach, but rather a composition weighted approach based on the amounts of compounds actually present in the finishes should be conducted. An additional analysis comparing the typical solvents found in solventborne clear wood coatings indicates the presence of solvent species other than glycols. These include toluene, xylene, and ethyl benzene, which all have significantly higher MIR values based on currently-available data. The inclusion of additional VOC species found in solventborne coatings clearly show an overall higher average MIR value then with the glycols listed and included in waterborne formulations. Lastly, the quantity of solvents found in solventborne formulations is much greater than the amount solvent found in waterborne coatings, which would make the weighted MIR significantly greater than the already higher average MIR. The commentator is merely suggesting that the industry should continue to circumvent the rule requirements by not making any changes to the small container exemption. Staff disagrees with this recommendation and is proposing to delete the small container exemption for clear wood coatings, effective July 1, 2006. However, in response to your comment, staff is also considering an alternate proposal that phases out the exemption and in the interim establish maximum VOC limits for coatings in those small containers. Specifically, exemption would be deleted effective July 1, 2008 and in the interim, the maximum VOC limit for varnishes and sanding sealers sold in small containers will be 450 g/l, and 550 g/l for lacquers.

2-4 Staff appreciates the commentator's understanding and history of the ceiling limit for Quick-Dry Primers, Sealers, and Undercoaters. During the development of the Averaging Compliance Option, discussions between CARB and the AQMD resulted in an agreement relative to specific ceiling limits. An exception to this agreement existed for the category of Quick Dry Primer/Sealer/Undercoaters. Whereas AQMD established the ceiling limit for this category at 350 g/l, for Statewide Averaging purposes, CARB established a ceiling limit of 450g/l of VOCs. The established ceiling limits are intended to provide manufacturers enough flexibility to meet the lower VOC limits without exceeding limits that have been in effect in California for many years. During meetings in 2001 and 2002 with manufacturers interested in averaging Quick-Dry Primers, Sealers, and Undercoaters the issue of ceiling limits and "Grandfathering" those companies that previously submitted annual reports under the exemption portion of the rule was discussed. Under the National AIM regulation, coating manufacturers may produce and distribute coatings in excess of the National Standards and pay emission exceedance fees to the EPA. It is the AQMDs and CARBs contention that introducing products in excess of national standards into our state and our local air district should not be allowed. A compromise was reached with those manufacturers that had submitted annual reports for 2001 for the Quick-Dry Primers, Sealers, and Undercoaters category that wished to average those products as part of their ACO Plan for 2002 and 2003. A ceiling limit of 450 g/l was allowed in order to conform to the CARB Statewide Averaging Program. With the sunset of the exemption for this category on January 1, 2003, all coating manufacturers must now meet the 200 g/l VOC limit as stated in the Table of Standards for Rule 1113. As such, the previous high limit of 350 g/l shall apply for manufacturers wishing to take advantage of the ACO. The few manufacturers that previously submitted plans for this category at the 450 g/l ceiling limit have expressed concern that they have not been given enough time to reformulate their products in this category, as they had assumed that they would continue to be allowed to average at the higher ceiling limit. The AQMD has agreed to allow those manufacturers to remain at the higher limit until July 1, 2006, at which time they will need to attain the ceiling limit of 200 g/l for averaging purposes, as well all other manufacturers wishing to average coatings in this category at that time. The limit for this category will be 100 g/l beginning July 1, 2006. Since there are many coatings currently available that meet, and have lower VOC content than the future limit, the AQMD believes that this additional time should give those few manufacturers the necessary additional time to reformulate. Staff disagrees that the higher VOC products perform better than their lower-VOC counterparts. AQMD's prior studies, including the NTS and KTA-TATOR studies have evaluated primers, sealers, and undercoaters, including dry time characteristics, and found that, when used in the Southern California, the waterborne primers, sealers, and undercoaters with VOC contents between 0 and 200 g/l actually dried faster than the solvent-based products with VOC contents at or greater than 350 g/l. Those studies also concluded that the lower-VOC products were superior in some key performance characteristics.

2-5 Staff appreciates the comments regarding waterproofing sealers and waterproofing concrete/masonry sealers. Staff has revised the proposal to increase the VOC limit from 50 g/l to 100 g/l for both categories, as well as delay the implementation date from January 1, 2005 to July 1, 2006. This establishes a similar implementation date as the primers, sealers, and undercoaters category. Staff believes that the proposed VOC limit of 100 g/l is feasible based on the availability of compliant products available and sold (Appendix A), as well as comments received from other commentators (Comment Letter #1). Staff agrees with the commentator regarding the low-solids coatings category and has revised the proposed rule to eliminate any additional low-solids categories, as well as the proposed VOC limit of 50 g/l on a material basis.

3-1 On July 31, 2003, Rule 1113 staff met with five roof coating manufacturers and a representative of the roofing union association at AQMD Headquarters. As one of the largest roofing product manufacturers in California, the Henry Company was invited to attend but for unknown reasons failed to participate. During this meeting, participants agreed that clay emulsion basecoats combined with white reflective coatings or waterborne aluminum reflective coatings held the most important position in built-up roof application in the South Coast air basin. Other synthetic rubber roofing materials are applied and bonded together with adhesive under the constraints of Rule 1168 – Adhesive and Sealant Applications. Because of the beneficial climate (application temperature and humidity) of this region, all protective top coats and/or basecoats with VOC of less than 50 g/l could be accommodated with either a white reflective or waterborne aluminum coating. This included coatings applied to urethane foam systems as well. When considering the California 2005 Building Energy Efficiency Standards (Title 24) for low-rise residential buildings and low-sloped roofs (thermal emittance of 0.75 and reflectivity of 0.70 for nonresidential low-slope and 0.40 for residential low-rise) it would be difficult for an aluminum coating to meet the emissivity requirements, except by having reflectivity in excess of 0.70 under the exception clause, and further the reflectance of aluminum coatings may not be this high. Given the input from these coating manufacturers, it was agreed that a standard of 50 grams of VOC per liter, less water was the most environmentally friendly, occupant friendly, solution that also complied with Title 24 and could be applied to a wide range of roofing substrates.

3-2 Staff has revised the proposal by clarifying the definition of roof coatings in Rule 1113 to exclude asphaltic roof coatings applied to nonmembrane roofs. According to Rule 1168 – Adhesive and Sealant Applications, all nonmembrane roof applications involving the use of plastic or asphalt roof cement, asphalt roof coatings, and cold application cement have no applicability in Rule 1113. Staff also believes that emergency roof repairs fall under the constraints of Rule 1168 because the materials are roofing sealants, but cannot state that all bituminous roof coatings are regulated under Rule 1168, only those that are applied to nonmembrane roofs.

3-3 Staff has listed in Appendix A numerous technical data sheets for acrylic white reflective coatings on the marketplace that are specified for use on various thermoplastic membrane roofing materials including sprayed in place foam, Hypalon and EPDM. These coatings provide high reflectivity and emissivity and are flexible, breathable, and chemical fallout and UV resistant. Staff therefore believes that low-VOC white acrylic reflective coatings have applicability across the environmental spectrum of the South Coast Air Bain. Furthermore, these coatings when properly applied have longevity, as they can be warranted for up to 15 years. Staff agrees that climate extremes can have negative impacts on successful coating of any kind, particularly in colder environments. Data with respect to average monthly minimum and maximum temperatures, as well as annual average temperatures can be found in the published paper by the SCAQMD, titled A Climatological-Air Quality Profile, California South Coast Air Basin, November 1980. Many years of data are represented here ranging from 4 years to a high of 64 years. Only the mountain locations of Mount Wilson, Sandberg (LA County) and Arrowhead (San

Bernardino County) registered minimum average temperatures below 40°F from three to six months out of the year. In these places, low-sloped roofs, which are typical of thermoplastic roofing installations, are not employed due to possible snow loading. The average annual temperatures of the four counties encompassing the AQMD are above 50°F. Most waterborne materials can be applied at 50°F and are not recommended for use when the temperature is less than 50°F. In addition, professional applicators realize that there are optimum conditions and seasons to apply roof coatings to avoid voiding manufacturer's warranties. Lastly, Rule 1113 contains a specialty coating category called Bituminous Roof Primers that have a VOC limit of 350 g/l. Staff, at this time, does not propose a lower limit for these bituminous roof primers.

3-4 Because of the chemical solvency of solvent-based coatings to dissolve dirt and other contamination, they are more forgiving in application than waterborne coatings. Staff recognized this problem by avoiding any VOC content reductions on bituminous roof primers. With the application of solvent-based primer to bituminous roofing materials, any surface can be prepared to accept basecoats and subsequent topcoats. Metallic roof coatings with VOC contents of 500 grams per liter are excessively high, particularly in light of the availability of waterborne aluminum roof coatings that can be formulated with VOC contents at or below 100 grams per liter. Upon further consideration, staff is recommending a separate category for aluminum roof coatings and setting a lower limit consistent with the lowest VOC containing waterborne aluminum roof coating emulsions, consistent with Title 24 for roof additions, alterations, and repairs (0.30 reflectivity) and opening the possibility of new aluminum roof coatings to achieve the high standards for new construction of the California energy code. A definition of aluminum roof coatings has been added as well, setting the elemental aluminum content to 0.7 pound of elemental aluminum per gallon of coating. We agree that waterborne aluminum coatings may be prone to chemical reactions that produce hydrogen and aluminum oxide stoichiometricly and the rate of reaction is accelerated by the addition of heat. Excessive pressure buildup and oxidation of the aluminum flake have been minimized through proprietary additives that slow this reaction. United Coatings, manufacturers of waterborne aluminum coatings, indicate that several drums of aluminum coating have been in storage for three years without excessive pressure buildup issues. If little hydrogen has been produced in three years with the chemical additive, it is necessarily true that little oxidation has also occurred. Most waterborne aluminum roof coatings are purchased in bulk and professionally applied within a short period of time, so that chemical reactions are not a concern. In the case of consumer use and storage of waterborne aluminum roof coatings, a pressure relief valve is installed on the containers sold to consumers, which ensures that pressure build-up will not occur. White reflective coatings are typically marketed to consumers.

4-1 The AQMD appreciates the commentators concerns regarding the lower limit for waterproofing concrete/masonry sealers and the proposed VOC limit of 50 g/l. In response to the comment, staff has revised the proposal to provide an additional 18 months for companies that currently manufacture and sell solvent-based products to be able to reformulate and test waterborne formulations. Additionally, in response to the comments, staff has increased the proposed VOC limit of 50 g/l to 100 g/l, allowing for additional new formulations using readily-available resin chemistry. Appendix A lists numerous manufacturers and products that comply with the proposed limit of 100 g/l, indicating the availability of a variety of resin systems, including acrylics, epoxies, and urethane-based waterproofing concrete/masonry sealers. Additionally, the 2003 CARB Survey of Architectural Coatings sold in 2000 indicates that 38% of the volume of waterproofing concrete/masonry sealers complied with the 100 g/l proposed limit to be implemented on July 1, 2006. Staff has also conducted a thorough socio-economic impact and cost-effectiveness analyses and deemed that the potential additional cost of the proposed rule amendment is reasonable and within an acceptable cost-effectiveness criteria adopted by the AQMD board.

4-2 Staff disagrees that acrylic solvent-based products are superior in performance than waterproofing concrete/masonry sealers. The AVES study includes a side-by-side comparison of acrylic, alkyd, and epoxy-based sealers that clearly shows the superior performance of the zero-VOC epoxy-based waterproofing concrete/masonry sealer compared to the alkyd- and acrylic-based sealers. Additionally, the environmental assessment has a detailed analysis comparing the health impacts from use of solvent-based and waterborne coatings, including the potential of exposure to isocyanates. The environmental assessments clearly highlight the benefits associated with reduced health impacts, as well as the availability of low-toxicity isocyanates available for two-component urethane products. Lastly, a thorough analysis was conducted that shows that free isocyanate monomer is only a concern when a two component urethane coating is improperly mixed and sprayed, which is typically not the method of application by consumers.

4-3 Staff's technology assessment clearly indicates that lower-VOC waterproofing concrete/masonry sealers are readily available and perform at an equal or in some cases superior level than their higher-VOC counterparts. Appendix A lists several of these products that comply with the proposed limit for waterproofing concrete/masonry sealers, including products used to coat driveways, patios, decks, and garages for residential and commercial applications. Staff has also observed the application of some of these products and interviewed property managers that used these products. Most of the property managers that used the low-VOC waterproofing concrete/masonry sealer are satisfied with their performance to date. Therefore, staff does not believe that it is warranted to propose a separate category for these substrates.

5-1 Staff has conducted an extensive technology assessment for roof coatings, and agrees that there are numerous types of roof coatings. However, staff disagrees with the simplistic approach of comparing VOC emissions from a single coat of an aluminum coating with a system comprised of a single coat of metal primer and one or two top coats of latex roof coating. Emissions are determined by using the material VOC (with water and exempt compounds) content of a coating rather than the coating VOC (less water and exempt compounds) content. Staff analysis found that emissions from applications of a primer coat and waterborne top coat are comparable or even less than a single coat of solventborne roof coating. Appendix A lists numerous roof coatings that comply with the proposed VOC limit of 50 g/l, and based on meetings with numerous manufacturers of roof coatings, perform as well as roof coatings with VOC content of 250 g/l. Staff has listed in Appendix A numerous technical data sheets for acrylic white reflective coatings on the marketplace that are specified for use on various thermoplastic membrane roofing materials including sprayed in place foam, Hypalon and EPDM. These coatings provide high reflectivity and emissivity and are flexible, breathable, and chemical fallout and UV resistant. Staff therefore believes that low-VOC white acrylic reflective coatings have applicability across the environmental spectrum of the South Coast Air Bain. Furthermore, these coatings when properly applied have longevity, as they can be warranted for up to 15 years. Staff agrees that climate extremes can have negative impacts on successful coating of any kind, particularly in colder environments. Data with respect to average monthly minimum and maximum temperatures, as well as annual average temperatures can be found in the published paper by the SCAQMD, titled <u>A Climatological-Air Quality Profile, California South Coast Air Basin, November 1980.</u> Many years of data are represented here ranging from 4 years to a high of 64 years. Only the mountain locations of Mount Wilson, Sandberg (LA County) and Arrowhead (San Bernardino County) registered minimum average temperatures below 40°F from three to six months out of the year. In these places, low-sloped roofs, which are typical of thermoplastic roofing installations, are not employed due to possible snow loading. The average annual temperatures of the four counties encompassing the AQMD are above 50°F. Most waterborne materials can be applied at 50°F. In addition, professional applicators realize that there are optimum conditions and seasons to apply roof coatings to avoid voiding manufacturer's warranties. For coatings that are currently certified under the USEPA Energy Star Program and have a VOC content of 100 g/l or less, the implementation date has been extended to January 1, 2007.

5-2 The AQMD appreciates the commentators concerns regarding the lower limit for waterproofing concrete/masonry sealers and the proposed VOC limit of 50 g/l. In response to comments, staff has revised the proposal to provide an additional 18 months for companies that currently manufacture and sell solvent-based products to be able to reformulate and test lower-VOC waterborne formulations. Additionally, in response to the comments, staff has increased the proposed VOC limit of 50 g/l to 100 g/l, allowing for additional new formulations using readily-available resin chemistry. Appendix A lists numerous manufacturers and products that comply with the proposed limit of 100 g/l, indicating the availability of a variety of resin systems, including acrylics, epoxies, and urethane-based waterproofing concrete/masonry sealers. These products represent a variety of uses, including concrete driveways, pool decks, vertical concrete block walls, concrete tilt up walls, and exposed aggregate. The list also includes products recommended for above-grade and below-grade, as well as interior and exterior uses. Lastly, there are several penetrating sealers that meet the DOT requirements, as tested under the NCHRP 244 tests. The AVES study includes a side-by-side comparison of acrylic, alkyd, and epoxy-based sealers that clearly shows the superior performance of the zero-VOC epoxy-based waterproofing concrete/masonry sealer compared to the alkyd- and acrylic-based sealers. Lastly, the availability and use of these products clearly demonstrate that these products perform well, especially since they are being used in the absence of any regulatory requirements.

5-3 Staff appreciates the commentator's understanding of water repellant and waterproofing sealers. Rule 1113 – Architectural Coatings defines waterproofing concrete/masonry sealers with both penetrating and film-forming sealers, and the manufacturer has the obligation to categorize their product for its specific use, and should not have any false representation.

5-4 Staff recognizes that the commentator does not provide any comments on the proposed VOC limits and implementation dates for stains, varnishes, and sanding sealers.

6-1 Staff appreciates the commentators desire to work with the AQMD on developing a proposed rule that achieves emission reductions with the need to maintain the availability of coatings that perform adequately for their intended uses. This perspective has been utilized by the AQMD in the past and continues to remain open minded to take into account suggestions and recommendations from industry with technical data to support those suggestions and recommendations.

6-2 Staff has had numerous public meetings with industry, and has had numerous discussions with manufacturers that have expressed interest in meeting privately with staff. Staff has provided the scope of the proposal to industry, including specific coating categories, at earlier working group meetings held on March 20, 2003, May 6, 2003, and July 16, 2003, and disagrees with the commentator that they were not provided the rule proposal prior to August 19th, 2003. Actual rule language and a preliminary staff reportwas developed and provided to the industry on August 19th, 2003, and the public hearing was postponed by one month, providing ample time for a meaningful exchange of information. Staff has also provided other information pertaining to the proposal, including alternative methods of reducing emissions from this source, including the potential to improve transfer efficiency for coatings applied, as well as the proposal to reduce emissions from clean-up solvents used in architectural coating applications. However, to date, the AQMD has not received any technical studies, performance data, additional compliant coatings or other information from the commentator or its member companies. The only meaningful feedback has been limited to the products included in Appendix A, and staff would like to thank the commentator and it's member companies. Additionally, with respect to the request for additional time to discuss the proposal, staff has delayed the public hearing by an additional month to provide more time for meaningful exchange with the industry.

6-3 Staff has provided the scope of the proposal to industry, including specific coating categories, at earlier working group meetings held on March 20, 2003, May 6, 2003, and July 16, 2003, and disagrees with the commentator that they were not provided the rule proposal prior to August 19th, 2003. Actual rule language and a preliminary staff report was developed and provided to the industry on August 19th, 2003, and the public hearing was postponed by one month, providing ample time for a meaningful exchange of information.

6-4 See Response to Comment #6-2. Additionally, the AVES study was conducted by the Technology Advancement Office and completed in March 2001, which resulted in a contract dispute with the contractor. That dispute has been recently resolved and the AQMD is now able to reference and publish the report, making it available to the public. Staff also wants to clarify that this study is not "the bases" but merely an example of performance capabilities of a low-VOC products on a side-by-side basis with higher VOC products. Staff disagrees that an additional ninety days will increase the flow of information from industry, but is proposing to extend the public hearing by an additional 30 days to provide additional time to industry to review the AVES study, the revised staff proposal, and most importantly, provide technical information to the AQMD to refute the staff findings. Staff has repeatedly requested this technical information from industry in working group meetings, the public workshop, and the public consultation meetings, which include numerous member companies of the commentator. To date, staff has not received any such empirical studies from industry. Some of the products developed under the AVES study, specifically clear wood coatings, have now been commercialized by Rustoleum Corporation, a major national paint manufacturer.

6-5 The commentator (National Paint & Coatings Association) suggests that its member companies are not truthful in the information forwarded to end-users in product and technical data sheets. The product and technical data sheets reviewed by staff contain actual test results, as reported by manufacturers, and staff has no reason to believe that the manufacturers are intentionally misleading the end-users, and would not do so in light of our litigious society. However, staff does not solely rely on information in the technical data sheets. Staff has reviewed performance of the lower-VOC products in discussions and testing from manufacturers of these products, including BONA-KEMI. Additionally, staff has reviewed KCMA certification requirements and found several products that comply with these standards, and are used both in the field and shop environments. Lastly, staff has evaluated a case studies report published by USEPA, which concludes that numerous clear wood products, including stains, sanding sealers, and clear wood topcoats have been successfully used by numerous wood coatings shops, and that additional staff research indicates that these same products are used in the field. Additionally, staff has conducted numerous site visits to observe the actual application of low-VOC products, as well as review substrates that were previously coated with the low-VOC products, including waterproofing sealers, waterproofing concrete/masonry sealers, stains, and clear wood coatings. The Staff Report provides a summary of staff's findings from the field visits conducted. Staff is currently evaluating their release of the detailed reports with the sites visited, prior to releasing the information to the public. Staff would again like to emphasize that information exchange is a two-way process. Even after numerous requests for this information, none of the NPCA companies nor NPCA have provided any of their side-by-side testing data that shows that lower-VOC products do not perform as well as their higher-VOC counterparts.

6-6 Staff's technical assessment shows that several manufacturers have indicated that they sell the same products, especially clear wood coatings, for shop and field finishing. SDA/Craft Technologies, a local manufacturer of compliant clear wood coatings, indicates that the same product is sold to the wood shops and field finishers, and is preferred by field finishers for lower odor, lower flammability, and superior performance. The commentator also does not provide any support for the notion that the lower-VOC clear wood coatings are not as easy to apply. Staff's assessment shows that lower-VOC clear wood coatings are applied using the same type of application methods (wiping for interior stain, brushing or spray) used to apply higher-VOC products. The commentator also indicates that the AQMD recognizes that low-VOC products do not apply as easily and therefore has limited the residential use of industrial maintenance coatings. The commentator does not consider why the residential use restriction was placed on industrial maintenance coatings. The commentator is encouraged to review the environmental assessment from past rulemaking, which clearly indicates that the AQMD restricts use of industrial maintenance coatings in residential environment not because of their supposed difficulty in application, but due to the potential health concerns of spray application of lower-VOC, two-component urethane coatings, an issue introduced by the industry for industrial maintenance coatings category in past rulemaking. Staff believes that transfer of technology for shop coatings is possible and already underway by a variety of manufacturers of clear wood coatings, based on letters forwarded by these manufacturers that indicate that the same product used in a shop environment is used for field application.

6-7 In response to the request for additional time, staff has revised the proposal to extend the compliance dates by an additional 18 months to provide more than 30 months for research and development, accelerated weathering and laboratory studies, and actual real time exterior exposure studies. VOC emission reductions from amendments to Rule 1171 – Solvent Cleaning Operations are close to achieving the SIP commitments. However, these emission reductions are subject to the technology assessments included in Proposed Amended Rule 1171, which may reduce the net emission reductions and create a shortfall for meeting the SIP commitments. Therefore, the AQMD has the need for additional VOC emission reductions, including proposed Rule 1113 to meet the overall emission reduction goals from Control Measure CTS07, as well as other emission reductions committed to in the AQMP. Appendix A is not intended to be all-inclusive, but merely a demonstration of the availability of compliant products with similar performance characteristics as their higher-VOC counterparts. Staff has repeatedly requested additional information from industry, including NPCA and its members, to provide information regarding their product lines, including products that comply with the proposed limit, as well as any laboratory and field testing comparing performance of these products. It is perplexing that the NPCA continues to request data from the AQMD that its member companies themselves generate. Staff also believes that the lower-VOC products listed in Appendix A are viable alternatives to products currently sold in the district. These products are currently available and are recommended for the same uses, with similar performance characteristics (i.e., they meet KCMA, NHCRP, etc. standards) as their higher-VOC counterparts. Therefore, there is no basis to conclude that these products, if not already sold in the South Coast, would not be viable products for their recommended uses. Staff agrees with your proposed implementation date of July 1, 2006, which is also overall similar to the proposed implementation dates in Comment Letter #1.

6-8 Staff research shows that a large volume of varnishes, stains, and lacquers are sold in small container not because of their superior performance, but for the reason that most consumers' need for a small volume to conduct small projects, such as bars, tabletops, etc. Staff agrees that the small container exemption may be necessary for some niche products, especially for touch-up and repair projects where compatibility of resin systems may be an issue. Appendix A lists numerous adequate replacements for their higher-VOC counterparts currently sold in small containers. The AVES study contains the superior ability of the low-VOC varnish and lacquer systems on touch-up and repair, as compared to the traditional higher-VOC lacquer and varnish systems. Therefore, staff is proposing to delete the small container exemption for clear wood coatings, effective July 1, 2006. However, in response to comments, staff is also considering an alternate proposal that phases out the exemption and in the interim establish maximum VOC limits for coatings in those small containers. Specifically, the exemption would be deleted effective July 1, 2008 and in the interim, the maximum VOC limit for varnishes and sanding sealers sold in small containers will be 450 g/l, and 550 g/l for lacquers.

7-1 The commentator agrees that the VOC limits for several coating categories can be further lowered, but at a cost and with additional time. In response to the comment, the proposed implementation date for most of the affected coating categories have been revised from January 1, 2005 to July 1, 2006, providing an additional 18 months to reformulate, test, and commercialize low-VOC products. For stains, the implementation date has been extended by an additional 42 months for additional testing. Staff has also conducted a thorough socio-economic impact and cost-effectiveness analyses and deemed that the potential additional cost of the proposed rule amendment is reasonable and within an acceptable cost-effectiveness criteria adopted by the AQMD board.

7-2 In response to this and other similar comments, staff has increased the proposed VOC limit for waterproofing sealers and waterproofing concrete/masonry sealers of 50 g/l to 100 g/l, allowing for additional new formulations using readily-available resin chemistry. Appendix A lists numerous manufacturers and products that comply with the proposed limit of 100 g/l, indicating the availability of a variety of resin systems, including acrylics, epoxies, and urethane-based waterproofing concrete/masonry sealers. See revised implementation date from Response #7-1. Staff does not believe that the proposed limits will result in compromising performance, cost, and time.

7-3 Staff recognizes that there are a variety of waterproofing sealers and waterproofing concrete/masonry sealers, and that formulations cover specific different uses. Appendix A lists a large number of compliant products that represent a variety of uses, including concrete driveways, pool decks, vertical concrete block walls, concrete tilt up walls, and exposed aggregate. The list also includes products recommended for above-grade and below-grade, as well as interior and exterior uses. Lastly, there are several penetrating sealers that meet the DOT requirements, as tested under the NCHRP 244 tests. The AVES study includes a side-by-side comparison of acrylic, alkyd, and epoxy-based sealers that clearly shows the superior performance of the zero-VOC epoxy-based waterproofing concrete/masonry sealer compared to the alkyd- and acrylic-based sealers. Lastly, the availability and use of these products clearly demonstrate that these products perform well, especially since they are being used in the absence of any regulatory requirements with such low VOC limits.

7-4 Staff has revised the proposed VOC limit and implementation date for the waterproofing and waterproofing concrete/masonry sealers. See Responses #7-1 & #7-2 for additional discussion.

8-1 Staff disagrees that an additional ninety days is necessary for the public hearing. Staff has repeatedly requested testing data from manufacturers over the past 6 months, and have not received any information to date. Staff, however, is providing for an additional 30 days for a public hearing to further discuss the technical feasibility of the proposed amendments. Staff believes that sufficient information is available and has been evaluated. The specific tests listed for each category have been completed under the AVES study, by manufacturers including BONA KEMI, and for the KCMA certification. If the commentator has already conducted these studies or plans to conduct the proposed assessment, the AQMD requests that you forward the results to us for additional information.

8-2 The AVES study conducted a detailed side-by-side analysis, comparing the performance characteristics of stains, varnishes and other clear wood coatings, and waterproofing sealers used on wood and concrete. The overall conclusion of the study was that the low-VOC and zero-VOC coatings performed at an equivalent, and for some performance characteristics, better than their higher-VOC counterparts. The AQMD believes that the commentators company has acquired the rights to the technology developed under the AVES study and has that testing information available. It is also staff's understanding that the commentator's company is starting to manufacture and market some of the technology developed under this study after extensive testing that validated the performance of these low- and zero-VOC products, including stains. The AVES Study, specifically for interior stains shows similar performance in terms of grain raising for waterborne and solventborne products. It also indicates that the waterborne stains dried significantly faster than two of the solventborne products, and had similar grain definition. Therefore, staff disagrees with the comments pertaining to an increase in grain raising for waterborne interior stains. Furthermore, Appendix A lists numerous products that meet the proposed VOC limits and list equivalent or superior performance characteristics. The AQMD again requests any testing information collected by the commentator as additional information to review for the rulemaking, especially empirical information that refutes staff's findings. Staff is proposing to delete the small container exemption for clear wood coatings, effective July 1, 2006. However, in response to comments pertaining to repair and touch-up, as well as formulation compatibility issues, staff is also considering an alternate proposal that phases out the exemption and in the interim establish maximum VOC limits for coatings in those small containers. Specifically, the exemption would be deleted effective July 1, 2008 and in the interim, the maximum VOC limit for varnishes and sanding sealers sold in small containers will be 450 g/l, and 550 g/l for lacquers.

8-3 Staff is continuing to evaluate the need for this transition time and recognizes that the Averaging Compliance Option could allow the continued sale of higher-VOC formulations for limited volume needed for touch-up and repair uses

8-4 Staff has evaluated several products currently available that contained acetone for consumer use. Flammability concerns were analyzed in detail in the prior environmental assessments that concluded that use of acetone does not pose an additional risk, when compared to coatings that contain toluene, xylene, and ethylbenze, all found in solvent-based clear wood coating formulations. As far as isocyanates are concerned, numerous products are included in Appendix A that do not contain any isocyanates. Additionally, the prior environmental assessments evaluated the degree of potential risk of isocyanates and concluded that less toxic isocyanates are available for two-component urethane coatings, and that only application by spray creates a potential health concern, which is not typically used by consumers.

8-5 Appendix A includes retail price of compliant products with higher-VOC products, and finds that the incremental costs of products that comply with the proposed limits is relatively low, mainly less than a 10% increase. However, as a part of the staff report, staff is evaluating even higher costs at the retail level to assess a worst case scenario, which shows that the overall cost-effectiveness is within the criteria previously adopted by the AQMD Board.

8-6 See Responses #8-1 to #8-5.

9-1 Staff disagrees that the proposal casually eliminates products that perform well and also disagrees that traditional solvent-based varnishes exhibit superior performance characteristics and appearance characteristics. The AVES study evaluated a low-VOC waterborne varnish formulation that used the RESILEX® resin system and compared its performance to three other commercially available varnishes with VOC content ranging from 250 g/l to 450 g/l. This evaluation indicated that the zero-VOC varnish had similar dry time characteristics, had the least grain raising, exhibited similar orange peel performance, had good sprayability, and had the best sag resistance. Under a systems analysis, where wood was stained and then subsequently coated with a sanding sealer, and two coats of a varnish, each system using the recommended stain and sanding sealer, the overall appearance qualities for the low-VOC varnish were similar to the higher-VOC varnish systems. The low-VOC system also exhibited the best hardness performance, and chemical resistance characteristics properties than the other three systems. Additionally, numerous manufacturers have varnishes with VOC of less than 275 g/l that meet the KCMA standard, requiring extensive performance testing.

9-2 Staff research shows that a large volume of varnishes, stains, and lacquers are sold in small container not because of their superior performance, but for the reason that most consumers' need for a small volume to conduct small projects, such as bars, tabletops, etc. Staff agrees that the small container exemption may be necessary for some niche products, especially for touch-up and repair uses when coating compatibility issues exist. Appendix A lists numerous adequate replacements for their higher-VOC counterparts currently sold in small containers for the categories included in the current proposal. Therefore, staff is proposing to delete the small container exemption for clear wood coatings, effective July 1, 2006. However, staff is also considering an alternate proposal that phases out the exemption and in the interim establish maximum VOC limits for coatings in those small containers. Specifically, the exemption would be deleted effective July 1, 2008 and in the interim, the maximum VOC limit for varnishes and sanding sealers sold in small containers will be 450 g/l, and 550 g/l for lacquers. The commentator is merely suggesting that the industry should continue to circumvent the rule requirements by not making any changes to the small container exemption. Staff disagrees with this recommendation and continues to propose removal of the exemption for clear wood finishes.

9-3 As indicated in Response to Comment #9-1 and #9-2, adequate replacement products are available that can be suitable replacements products for their higher-VOC counterparts. Staff appreciates the commentator's assistance in correcting Draft Appendix A, and has requested additional information about the commentator's compliant products currently sold in the marketplace. The commentator is merely expressing his opinion on the potential impacts on the marketplace that lower-VOC varnishes could have, but does not support the lower performance claims with any empirical studies like the AVES study performed under a AQMD contract, which clearly shows the equivalent or superior performance of the low-VOC varnish system, as compared to the higher-VOC solventborne varnish systems. Furthermore, Appendix A lists numerous waterborne varnishes that have a VOC content less than the proposed VOC limit of 275 g/l and are commonly used as exterior varnishes. Therefore, staff does agree that the proposal will create huge gaps in the marketplace.

9-4 Staff's technology assessment shows that numerous clear wood coatings that are appropriate substitutes are currently available and in use for varnishes, lacquers, and sanding sealers. They are considered distinct categories, as illustrated by each one having a definition in the rule; however, technology that performs well exists today for the proposed limit of 275 g/l for each of these categories. As far as the detailed CARB survey data is concerned, the AQMD has a confidentiality agreement with CARB to review and summarize the CARB-verified data. Without violating the confidentiality agreement, the AQMD cannot release the detailed data, including sales volume and actual VOC content information to the public. The commentator may consider obtaining the data from CARB directly.

9-5 Appendix A and the staff report lists some exterior deck stains. Okon Co. manufactures and sells a product called DECK STAIN, which is a water-based water repellent and wood stain for horizontal wood applications. This product is designed for decks, milled, pressure-treated, and rough lumber. ASTM testing results show that this product performs equally or better than its higher-VOC counterparts. For example, this product passes the QUV 1,000 hour test for Ultraviolet light resistance, as well as ASTM D3359-90 for vapor transmission. VOC is approximately 100 g/l. Columbia Paint & Coatings manufactures and sells the Woodtech Solid Color Pre-Stain (09-870), a low VOC (62 g/l) interior and exterior bare wood substrates. The technical information from the manufacturer indicates "excellent color retention, good penetration, and recoat properties." The company representative indicated that this product forms a hard film that is abrasion resistant. Epmar Corporation also manufacturers and sells a variety of low-VOC stains, including pigmented, clear, and semi-transparent. The Kemiko Transparent Stain is a single component product recommended for use on concrete, plaster, polymer cement, and wood. Applications include walkways, decks, hospitals, schools, shopping malls, restaurants, and theme parks. The VOC content is less than 30 g/l. Furthermore, based on detailed evaluations conducted by Consumer Reports Magazine (June 2002 and August 2003). The analysis included clear, semi-transparent, toned, and opaque stains used on horizontal surfaces such as decks. The conclusion from the August 2003 article indicates that opaque stains, mainly due to the higher pigment content, last the longest, typically more than three years, whereas "a semi-transparent finish may need to be reapplied every two to three years. The conclusion also indicates that clear deck finishes don't last more than one year. Nonetheless, based on the comment, staff has revised the implementation for stains to July 1, 2007, providing more time for additional development and testing. Additionally, this category is included in the future technology assessment, where specific characteristics could be assessed.

9-6 The commentator's suggestion regarding reorganizing Draft Appendix A is appreciated and staff has reformatted Appendix A based on the comment. Staff has also added product and technical data sheets for certain products highlighted in the staff report as an Appendix, to provide additional performance characteristics.

9-7 Based on comments, staff has revised its proposal and has retained the VOC material limit for all low-solids coatings.

9-8 Based on several comments received from the commentators regarding adequate time to reformulate, test and commercialize a product, staff has revised the proposed implementation date from January 1, 2005 to July 1, 2006 for most categories with proposed lower limits. For stains, the implementation date has been extended to July 1, 2007, providing a total of 42 months. While staff has included an extensive list of products that already comply with the proposed limits in Appendix A, the revised proposal provides over 30 months to companies that do not have compliant products for reformulation, testing, scaleup, and commercial introduction. The lower-VOC products are relatively new in the marketplace, as compared to their higher VOC counterparts that have been in the marketplace for over 10 years, in some cases. Therefore, it will take time for significant market penetration to take place for the newer products. However, it is clear that numerous compliant products under each of the categories are available and in use from a various manufacturers, both large and small. The performance data cited by the manufacturers, as well as additional analyses in the AVES study, KCMA, and NHCRP standards clearly indicate that these lower-VOC products perform well and are available. The commentator is merely expressing his opinion that these products are not sufficient replacements, without citing any performance data, empirical studies or other data that can be used to support his claim about the limited performance of low-VOC formulations. The AQMD has repeatedly requested this information from the industry and has failed to receive anything to validate the industry's unsupported assertion that the low-VOC products lack performance or usage for certain applications. Industry participants in the Technical Advisory Committee have provided no data or studies that refute the AQMD's findings. Several manufacturers of compliant products have verbally testified at the public workshop, as well as provided comments in writing, that supported the AQMD staff's findings, and have also provided test data to prove performance of these low-VOC products. Comment Letter #12 is an example of a letter supporting the proposed limit for clear wood coatings, as well as additional potential cost savings associated with the use of compliant coatings. The manufacturers that believe that the proposed limits are not feasible have not provided any substantial empirical date to prove their case.

9-9 This comment is not specifically relevant to Rule 1113 and needs to be forwarded as a comment for Proposed Amended Rule 1171.

10-1 Staff has reviewed all relevant data submitted prior to developing a rule proposal and forwarding it to the public. Staff reviewed the data submitted and does not agree with the conclusions, based on the information provided.

10-2 Staff appreciates the commentator's perspective on the history of the waterproofing concrete/masonry sealers. Staff recognizes that the commentator claimed that a typographical error had occurred in the original letter, and that Jack Broadbent, Deputy Executive Officer was involved in the creation of this category. However, that was four years ago, and low-VOC technology has been developed that meets all the performance requirements of the waterproofing concrete/masonry sealer, including the proposed VOC limit of 100 g/l. Appendix A includes a comprehensive list of penetrating and film-forming waterproofing concrete/masonry sealers that meet or exceed the performance of the products listed in the comment letter, as well as the standards listed in the National Cooperative Highway Research Program (NCHRP) 244. The following are two such products. L&M Construction Chemicals, Inc. manufactures Aquapel & Aquapel Plus, a micro-emulsion, silane/siloxane water repellant bonds directly with the substrate, resulting in very good resistance to moisture and salt, and has a VOC of less than 50 g/l. This product is recommended for use on buildings, parking decks, monuments, garages, driveways, dams, piers or any other concrete surfaces. Technical data from the manufacturer indicates that reduced water adsorption by 85% and chloride intrusion by up to 90%. Both products exceed NCHRP 244, Series II requirements for salt and water penetration. Additionally, Rainguard International Products Company, a local manufacturer, manufactures and sells Blok-Lok®, a clear water repellant with a VOC content of 37 g/l that is comprised of polysilanes. This product is recommended for use on masonry block, concrete, stucco, cement plaster, and other composite construction materials. Testing based on ASTM procedures conducted by the manufacturer shows that the product equal or superior performance to its higher VOC counterparts. For example, ASTM E-514-86, Wind Driven Rain tests indicate that the use of Blok-Lok® reduces leak by 98.7%, reduced chloride ion intrusion (NCHRP No. 244), and allows 100% water vapor transmission (ASTM D-1653). Appendix A also lists numerous film-forming waterproofing concrete/masonry sealers that meet the proposed VOC limit of 100 g/l, as well as exhibit the performance characteristics listed by the commentator. The proposed amended rule is not eliminating waterproofing concrete/masonry sealers category, but is simply requiring formulations based on the latest, high performance resin systems available, as indicated by the large number of compliant products already in the marketplace. At a recent public consultation meeting, the representative from Textured Coatings of America, as well as a raw material supplier indicated that compliant products for milder climates like Southern California were available that meet all the CALTRANS requirements.

10-3 The competitors and resin companies listed by the commentator may not have the compliant products, but there are numerous other manufacturers, as well as some raw material suppliers that have technology that meets the proposed VOC limit of 100 g/l, both for film-forming and non film-forming (penetrating) sealers. The commentator indicates that Degussa does not have any products that comply with proposed limit of 100 g/l. One of Degussa's highest performing line of products are sold under their THORO line, with several waterproofing concrete/masonry sealers formulated well below the proposed VOC limit of 100 g/l, and are listed in Appendix A. For example, THOROCOAT ® DOT is a waterborne high build acrylic coating specifically for USDOT applications. This product has a VOC of 58 g/l and has superior overall performance specifications listed by the commentator for XL-70® product. Other water-proofing concrete/masonry sealers from Degussa include Thorocoat ® F-74, foundation coating, Thoroclear ® Special and Thoroglaze ®, all of which have a VOC content of under 100g/l. These products represent both penetrating and film-forming sealers. Appendix A lists numerous other products that comply with the proposed limits.

10-4 The commentator is correct that the waterproofing concrete/masonry sealers cover a broad range of applications, including waterproofing and damp-proofing. However, Appendix A shows compliant products for the various types of applications, including products with similar characteristics as the TEX·COTE® XL-70®. The compliant products listed in Appendix A have film-forming products that need primers and do not need primers. However, a review of the technical data sheet for TEX·COTE® XL-70® indicates, under Table 2 – Recommended Primers that the XL-70® Primer or XL-70® Slush Coat is recommended for concrete, uncured, bare, Cement plaster, and brick (bare). Other primers from Textured Coatings of America are recommended for other substrates that can be coated with TEX·COTE® XL-70®. Therefore, the commentator's statement about the XL-70® being a primerless product is incorrect, since their own technical data sheets contradict the comment.

10-5 The commentator lists typical tests performed on waterproofing concrete/masonry sealers, which several of the products listed in Appendix A also pass. The commentator is again contradicting the technical data sheets published on the XL-70® product that indicate the need for a primer. Lastly, the commentator is indicating that acrylic technology is the only alternative resin system available and is inferior in terms of durability. Appendix A listed numerous waterproofing concrete/masonry sealers that are formulated with superior epoxy and urethane resin systems that outperform typical modified acrylic or alkyd technology, such as the one used in the XL-70® product. The commentator does not provide any empirical studies to show that an alternative, properly-formulated product would need to be recoated two- to three times over the expected lifespan of 20 years for the XL-70®. The major indicator of overall durability listed in comment 10-5, the Salt Spray Resistance based on ASTM B117, lists a very moderate 300 hours of exposure. Most acrylic-based products outperform this criteria, with epoxy- and resin-based sealers exceeding this performance claim by an order of magnitude or greater. The AQMD evaluates the industry as a whole, and data shows that there are several low-VOC (< 100 g/l) products that meet the listed characteristics.

10-6 The CARB's SCM does have a higher limit for Waterproofing Concrete/Masonry Sealers, but the remainder of the state is also not listed as an 'extreme' non-attainment region, as is the case with the AQMD. This requires the AQMD to adopt more stringent requirements than the CARB's SCM. Additionally, a discussion with CALTRANS indicates that their requirements for penetrating waterproofing concrete/masonry sealers is limited to a 40% silane/siloxane content, and do not necessarily review the additional testing information provided by most manufacturers.

10-7 Staff disagrees with the commentator's recommendation to not revise the VOC limit for waterproofing concrete/masonry sealers due to the reasons listed in Responses 10-1 to 10-6. VOC emission reductions from amendments to Rule 1171 – Solvent Cleaning Operations are close to achieving the SIP commitments. However, these emission reductions are subject to the technology assessments included in Proposed Amended Rule 1171, which may reduce the net emission reductions, and create a shortfall for meeting the SIP commitments. Therefore, the AQMD has the need for additional VOC emission reductions, including proposed Rule 1113 to meet the overall emission reduction goals from Control Measure CTS07, as well as other emission reductions committed to in the AQMP

10-8 Staff has revised the proposal for waterproofing concrete/masonry sealers by increasing the VOC limit of 50 g/l to 100 g/l, as well as delaying the implementation date by an additional 18 months to provide sufficient time for manufacturers to reformulate, test, and commercialize this technology. The extended implementation date reflects comments made by a national paint manufacturer, as well as the National Paint & Coatings Association.

11-1 The AQMD appreciates the commentator's goal of reducing emissions. The staff would also like to commend TNEMEC in its ability to develop new products within the last few years.

11-2 Recognizing TNEMEC's efforts and capabilities in developing new products that perform at a high level, staff would like to emphasize that TNEMEC encourage metal coating shops to use the lower VOC products, including flouropolymer coatings, in the shop, in an effort to minimize any touch-up and repair issues that may exist as part of the field installation of the shop-coated substrates. Staff appreciates the small quantity of coatings needed for these small touch-up and repair applications and encourages the commentator to utilize the Averaging Compliance Option of Rule 1113, which was designed for these types of specific needs for small volume coatings with higher VOC than the current limit. Staff has forwarded the Averaging Implementation Guidance Document and invited the commentator to share its sales data with staff to assess the viability of the Averaging Program to mitigate this issue, but has not received any information from the commentator. Staff will also consider lowering the VOC limits in Rule 1107 to match the requirements of Rule 1113 to reflect the high-performance, low-VOC coatings available. This potential revision to Rule 1107 would not only mitigate this concern, but yield additional VOC limits needed to implement the 2003 AQMP.

11-3 Staff does not believe that a specific coating category for Extreme Durability Coating, typically fluoroolymer-based coatings, is necessary based on the technology assessments conducted in the past, including the comprehensive Phase II Assessment Study completed by National Technical Systems that concluded that some of the most durable industrial maintenance coatings systems have a VOC content of less than 100 g/l.

11-4 The National AIM VOC Rule has higher limits for most categories. Additionally, CARB's SCM also has some higher limits for some categories, but the remainder of the nation and state are not listed as an 'extreme' non-attainment region, as is the case with the AQMD. This requires the AQMD to adopt more stringent requirements than the National AIM Rule and the CARB's SCM. The AQMD believes that the data gathered in support of the limits indicates that compliant coatings are available and in use. Additionally, as stated in Response to Comment #11-2, the AQMD will re-evaluate Rule 1107 limits to yield additional VOC emission reductions to implement the 2003 AQMP.

12-1 The AQMD appreciates BonaKemi's role as a market leader in the U.S. for waterborne technology for clear wood coatings used in hardwood flooring industry. Staff also appreciates the commentator's support in lowering the VOC limit for clear wood finishes to 275 g/l. Staff's technology assessment has also concluded that waterborne urethane varnishes out-perform their solvent-based higher VOC counterparts. The AVES study clearly supports this conclusion.

12-2 Staff agrees with the commentator and has not proposed lowering the limit for interior high solids stains, since the overall coverage provided by a gallon, and therefore emission benefits are relatively low from this category. Staff agrees that the overall appearance and depth of the final film is more a product of the staining, than the subsequent topcoats. The AQMD also recognizes the reduction in emissions from use of waterborne coatings associated with the use of waterborne coatings.

12-3 Staff agrees with the commentator that there are several different factors for the preference by professional painters for solvent-based products, mainly the misguided perception that waterborne finishes are less durable than solvent-based finishes. Staff has reviewed the results for your products from the Colorado State University study, as well as through the AQMD's efforts in studies conducted by AVES, NTS, and KTA-TATOR.

12-4 Staff also recognizes that the initial cost of the properly-formulated waterborne products is greater than their solvent-based counterparts, but from a life-cycle cost perspective, taking into account the longer life of waterborne finishes, the overall cost is significantly lower for waterborne products, when spread out over the life of the coating. Even recognizing the longer term cost benefits, the AQMD has still analyzed the impacts of an overall cost increase and concluded that the proposed amendments are within an acceptable cost-effectiveness. Staff also agrees that the waterborne products have somewhat different application properties that are easily overcome with a short learning curve. Staff agrees that with some time, as provided in your example of the transition from solvent-based alkyd enamels to waterborne latex, contractors are able to make a successful change.

12-5 Staff agrees with the commentator that the small container exemption may be used to circumvent the rule limits, which defeats the purpose of the small container exemption to serve as a transition period for introducing new technologies, as well as serving a small volume niche market.

LATE COMMENT LETTERS

The Public Workshop for Proposed Amendments to Rule 1113 was held on September 4, 2003. The closing date for comment letters was September 12, 2003. The following comment letters were received after the comment period closed and staff was unable to place the letters and responses in the Set Hearing Package. Staff has included the following comment letters received as of November 14, 2003, and the responses in the Staff Report, Appendix D, for the Final Hearing Package to be held on December 5, 2003.

Comment Letter #13 – Richard Deight, Architect

Dan Russell
Planning, Rule Development and Area Sources
SCAQMD
21865 Copley Dr.
Diamond Bar, CA 91765

8310 Waverly Cir.
Buena Park, CA 90621
October 9, 2003

Re: PAR 1113

Dear Editor,

13-1 As a registered architect, I am concerned about restrictions on volatile organic compounds (VOCs) in architectural coatings. In 1996 the South Coast Air Quality Management District voted to restrict VOCs in house paint, claiming so-called "pollution-free" paint would reduce emissions 10.5 tons a day. In 1999 the SCAQMD sought rule changes that would reduce VOCs another 22 tons. Paint makers sued.

- VOCs are trace amounts of vapor that are lighter than air. How many tons of paint must be in use on a given day to produce 22 tons of VOCs? Twenty-two tons of VOCs a day translate into an unbelievable 8030 tons a year. Someone must figure everyone in the South Coast Basin has dozens of open paint cans sitting around, and is painting and repainting every building day in and day out. It's a wonder anyone has time to hold down a job!

- The SCAQMD thrives on bureaucratic doublespeak. Attend their so-called public hearings, and you'll see an agency that operates free of checks and balances, and bases decisions on staff recommendations regardless of public input. They routinely deal in abstract nonsense like 30- or 40-ton "universes." Trace amounts of vapor released into the air each day weigh 22 tons because they say so.

13-2

- The SCAQMD chooses to ignore industry claims that proposed rules are not cost-effective and are counterproductive. VOCs give paint its durability. A painter will tell you that paint is the least expensive part of a labor-intensive job. Since pollution-free paint is harder to apply and has to be redone every few years, what have we gained—and at what cost? The average cost of repainting the exterior of a house, for example, is $3000 to $5000. What about buildings that require specialized, commercial-grade paints and coatings? Will the SCAQMD pay to have our homes and buildings repainted when the mandated paint cracks, fades, and discolors? I doubt it.

13-3 Let us take this opportunity to address the real cause of air pollution in Southern California: too many people, not a few open cans of paint. The Board must be desperate to justify its existence, and is attempting to micro-manage consumer products. Almost everything we use is a theoretical source of pollution, so the possibilities are endless.

The mandate for reformulated paint is purely political. It reflects regulation for regulation's sake, and has nothing to do with clean air or common sense.

Sincerely,

Richard Deight, Architect

Comment Letter #14 – Dunn-Edwards Paints

Dunn-Edwards PAINTS ®
THE PAINT THAT PROTECTS.®

October 9, 2003

Dr. Laki Tisopulos
Assistant Deputy Executive Officer
Planning, Rule Development & Area Sources
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 East Copley Drive
Diamond Bar, CA 91765

RE: PROPOSED AMENDED RULE 1113: ARCHITECTURAL COATINGS

Dear Laki:

This is in response to your suggestion that members of the Rule 1113 Working Group provide written comments in support of our request to eliminate the "residential use" restriction on Industrial Maintenance Coatings under Rule 1113. The rule version currently in effect duplicates relevant language in both the definition of Industrial Maintenance Coatings at (b)(24), which states: "Effective January 1, 2004, Industrial Maintenance Coatings are not for residential use…" and in the section on requirements at (c)(2), which states: "No person shall apply or solicit the application within the District of any industrial maintenance coatings for residential use…." Additional minor modifications are included in the latest Proposed Amended Rule 1113, although the term "residential use" remains undefined.

14

This language is an artifact of the 1989 ARB Suggested Control Measure for Architectural Coatings ("SCM"), proposed at a time when Industrial Maintenance Coatings had, and were expected to continue having, higher VOC content than allowed in many alternative categories of coatings that could be substituted for Industrial Maintenance Coatings under certain conditions. With the proposed lowering of the applicable limit to 250 g/L, the 2000 ARB SCM deleted this language, since it would have the effect of preventing the substitution of lower-VOC Industrial Maintenance Coatings in place of higher-VOC alternatives in other categories (for example, Rust Preventative Coatings). At present, 18 local air districts in California have adopted versions of the ARB SCM, and none of these rules contains the "residential use" restriction.

Under certain exposure conditions that allow the use of Industrial Maintenance Coatings (such as "exterior exposure of metal"), an Industrial Maintenance Coating may be an adequate substitute for a Rust Preventative Coating, which is allowed a VOC content of 400 g/L. Obviously, such a substitution would be expected to provide emission reduction benefits, without any adverse health impacts since Industrial Maintenance Coatings are, as indicated on the label, "For Professional Use Only," and professionals are trained in the safe use of such materials.

Dr. Laki Tisopulos
October 9, 2003
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Concerns regarding potential adverse health impacts of Industrial Maintenance Coatings arose in a different context during the rule amendment process leading up to the May 1999 amended Rule 1113. At a Working Group meeting on December 9, 1998, District staff presented for discussion a table of proposed VOC content limits and effective dates for various categories of architectural coatings, including Industrial Maintenance Coatings (a copy of the meeting agenda and table is enclosed). The proposal for Industrial Maintenance Coatings was to lower the current limit of 420 g/L down to 100 g/L by 2001, and further to 50 g/L by 2005 (without any viable averaging provision). The industry response to this proposal generally was expressed in the EL RAP letter of January 5, 1999 (copy enclosed), quoted in part as follows:

> "We find three major problems with the current draft proposed amended rule: first, the VOC content limits proposed for the categories to be amended are technologically, economically, and environmentally infeasible; second, the deadlines proposed for implementing those limits would preclude needed technology advancements; and third, the rule fails to incorporate any viable innovative approaches that might achieve greater benefits at far lower costs."

Various paint manufacturers submitted similar comments independently, and some (e.g., Benjamin Moore and Vista Paint) commented specifically on the potential adverse health impacts of the proposal for Industrial Maintenance Coatings. In essence, their argument was that the extremely low limit proposed, in conjunction with an extremely short implementation period, would have the effect of banning most currently available products, while not allowing the three to five years necessary for development and testing of new high performance coatings.

This would limit the options to low-VOC high performance coatings already available at that time, which were almost exclusively two-component (catalyzed) high-solids coatings. These products carry specific health hazards as they often contain chemicals that are sensitizers (or potential sensitizers) that can provoke severe allergic reactions including respiratory paralysis. These chemicals, such as isocyanates, are present as highly volatile unreacted monomer in the resins of these products, and are fully released from the coatings during application, drying and curing, regardless of application method. District staff countered that the potential adverse health impacts would be contained by the "residential use" restriction.

Ultimately, District staff was persuaded to propose higher limits and longer implementation periods, and to include Industrial Maintenance Coatings among the categories subject to a simplified averaging provision, so that the issue of adverse health impacts was thereby mitigated. The ARB SCM later incorporated the same initial limit (250 g/L) and averaging provision, with a longer timeframe (until January 1, 2004). As a result, the health issue was not even raised in public comments on the SCM, and the "residential use" restriction was deleted.

14 Dr. Laki Tisopulos
October 9, 2003
Page 3

Subsequently, Rule 1113 was revised to align the effective date for the lower limit on Industrial Maintenance Coatings with the date in the SCM (January 1, 2004). At this point, therefore, the "residential use" restriction in Rule 1113 is unnecessary and counterproductive to the goal of promoting the use of lower-VOC coatings wherever such a coating may be an adequate substitute for a higher-VOC alternative. Accordingly, we request that the restriction be eliminated in the current round of amendments.

If you have any questions, or need any further information, please feel free to call me at (323) 826-2663.

Very truly yours,

DUNN-EDWARDS CORPORATION

Robert Wendoll
Director of Environmental Affairs

(Enclosures)

Comment Letter #15 – Ellis Paint Company

ELLIS PAINT COMPANY

October 17, 2003

David De Boer
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, CA 91765-4182

Re: Definition of Pre-Treatment Wash Primer under Rule 1113

Dear Mr. De Boer:

Please refer to my fax of 8/19/03, a copy is attached.

Yesterday, October 16th, I attended the Public Consultation meeting of Rule 1113.

15 After the meeting I had the opportunity to speak to Mr. Naveen Berry and requested to have the definition of Pre-Treatment Wash Primer revised to be consistent with Rules 1107 and 1151 which define the product as adhesion promoter <u>and corrosion resisting</u>.

I would appreciate that this revision be made before adoption of the current amendment.

Thank you.

Sincerely,

J. Tashjian

Joseph Tashjian
V. P. and General Manager - Operations

Cc: Mr. Naveen Berry, SCAQMD

Attachment: 1

JT/ab

ELLIS PAINT COMPANY
3150 East Pico Blvd.
Los Angeles, CA 90023
www.ellispaint.com, Main Phone: (323) 261 8114, Fax: (323) 264 2579

Comment Letter #16 – Life Paint Company

William Milner
Air Quality Engineer II
South Coast Air Quality Management District

RE: Rule 1113 Proposal

Dear Mr. Milner and Staff,

Here are Life Paint Company's comments regarding SCAQMD's proposals to Rule 1113 concerning the category, Roof Coatings.

16-1 Our company currently manufactures and sells in the district five different formulas of roof coatings. All of these formulas are below or at 100 g/l of VOC. Life Paint can manufacture these products at a VOC of 50 g/l with drawbacks, such as: dirt pick-up resistance will reduce, tensile strength will decrease (the film's cohesion will decrease and therefore be more easily torn) and freeze thaw stability will be sacrificed. Also, one of these five formulas is one of five products listed in Appendix A as an ENERGY STAR™ product. To be able to place an ENERGY STAR mark on a roof coating product, that product has to undergo three years of testing data. And although ENERGY STAR'S requirements are not as restrictive as California Energy Commission's Title 24, ENERGY STAR products are more widely publicized by the EPA through home shows, TV commercials, Point of Sale advertising, the wide freedom the EPA allows for using the ENERGY STAR marks, and web sites and web links. The CEC does nothing of that type of publicity to help sell products that match their own standards. Also, Title 24 is standard only for new construction, ENERGY STAR'S roof coating program is for all types of construction, old, new, or renovations. If the proposal to Rule 1113 passes as suggested, at least five products will have their ENERGY STAR mark taken away, according to Appendix A. These products will have to go through a reformulation period and then three years of testing data to be submitted back to the EPA in order to regain the ENERGY STAR mark once again. Sales for these products will drop at a dramatic pace and then have to enter the market once again and be solidified and accepted by contractors and users once more. This proposal directly affects the sales of specific products manufactured by specific companies.

Therefore, Life Paint does not agree with the proposal as set forth by SCAQMD. Technically, it is impossible to reformulate all acrylic roof coatings to 50 g/l VOC and these products to remain at the status quo. Coatings companies are already spending hundreds of thousands, if not millions, of dollars reformulating products for the 2006 and 2008 amendments that have already passed. Life Paint suggests two alternatives to the proposed Roof Coating category amendment. One, to lower the current allowable VOC of 400 g/l to 100 g/l thereby saving the reformulation issue with four of the five listed ENERGY STAR products sold in the South Coast Air District according to Appendix A. Another suggestion would be to lower the current allowable VOC of

16-2 400 g/l to 50 g/l with an ENERGY STAR exemption. The exemption would be for a period of four years from the date of the Board's passing of the proposed rule amendment, assuming the Board passes the proposal. One year allowed for a period of reformulation and three years allowed for a period of ENERGY STAR acceptance testing.

Thank you for hearing Life Paint's concerns and suggestions.

David Sibbrel

Project Manager

Comment Letter #17 – NPCA

October 23 , 2003

Mr. Dan Russell
Planning, Rule Development and Area Sources
SCAQMD
21865 Copley Drive
Diamond Bar, CA 91765

RE: NPCA Comments on Proposed Amendments to Rule 1113 Made at October 16, 2003 SCAQMD Public Consultation Meeting

Dear Dan:

As you know we provided comments on September 12, 2003 to previous proposed amendments to Rule 1113. Many of those comments about process by which the staff identifies technologically feasible coatings are equally applicable to the latest round or proposed revisions, and bear repeating here.

17-1

We are disappointed to see that the District continues to base their decision on viability of new technology almost exclusively on product data sheets and Internet ads for products. While the district has indicated that several companies that have conducted side-by-side comparisons of zero, low and high VOC, this data has not been shared with members of the Working Group nor has it undergone any type of peer review that we are aware of. This is the same situation with the site visits, which are mentioned in the draft staff report. We have been told about them but we have yet to see any written reports that document the conclusions of the field trials.

We request that the district make copies of all of the comparative test data and summaries of the field test available to members of the Working Group for their review and comment.

17-2

We are also deeply concerned about the staff's continued reliance on the idea that coatings/coating technology used in an industrial setting (e.g. wood cabinet shop) can readily be used by the do-it-yourself (DIY) consumer. Industrial coatings are formulated to be applied in a control manufacturing setting by highly trained individuals using specialized application equipment. Products sold for application by DIY consumers must meet a higher standard of user friendliness. The district recognizes this very concept by restricting the residential use of industrial maintenance coatings. While a particular coatings technology used in an industrial setting may be formulated to meet the higher demands of the consumer market, the wholesale transfer of industrial coatings products to the consumer market is neither possible nor advisable.

With this backdrop to our basic and continuing concerns about the process we set out specific concerns with the latest new revisions that were proposed and discussed at either the September 29 Working Group and at the October 16 Public Consultation meeting.

17-3

The July 1, 2006 Compliance Date for Clear Wood Finishes, Stains, Waterproofing Sealers and Waterproofing Concrete Masonry Sealers: While we recognize that we requested an extension for these coatings limits until July 1, 2006, on further reflection we believe that the date of compliance should be extended until July 1, 2008. In evaluating our request, you should by now be aware from our numerous previous comments that we do not believe that the limits that are proposed for these coatings are technologically feasible. Serious performance problems will attend the coatings formulated at such limits and all industry can do is to attempt to minimize those problems. Moreover, consumers will have to be educated to about how to best use the lower performing products. It will take a great deal of more time to do this than the July 1, 2006 date would permit. Therefore we request an additional two years until July 1, 2008

Moreover, manufacturers supplying the South Coast market will be forced to make major product changes (i.e., entirely new formulation platforms and technologies) in order to meet these new limits. Under normal circumstance it takes 3-5 years to formulate and market a new product This time frame would includes development of the new product formulation at the required VOC level [if technically feasible]; conducting laboratory testing; field testing; and then test marketing of the new product to insure acceptance in the marketplace. In the case of exterior products with a functional performance criteria, product development times will be longer due to the need for running extended exterior durability tests.

Therefore we believe our request for July 2008 compliance dates for all of the Phase III VOC limits is a reasonable one. This is particularly so since these reductions do not have to be in place until 2010.

17-4

Waterproofing Sealers at 100 g/l: Allowing an additional 50 g/l for this coating than the proposed 50 g/l does not alleviate our concerns about the technological feasibility of the limit. Whether at 50 g/l or 100 g/l, the technology allowed by such limits is limited to very low VOC water borne coatings, high solids, or two pack coatings, which will not meet all of the diverse application and performance requirements of this coating category. At the October Public Consultation meeting concerns about high performance waterproofing sealers were expressed by representatives from both Textured Coatings of America and Degussa Corporation.

It was suggested at the Consultation meeting that a separate coatings category be recognized for "high performance waterproofing sealers". Textured Coatings of America suggests the following definition for such a coating category:

17-4

> "High performance concrete/masonry waterproofing sealer –film-forming or non-film forming sealers that are formulated for sealing concrete, masonry, and mineral substrates to provide resistance against water, alkali, acid, ultraviolet light and staining. Must pass Water Vapor Permeability ASM E-96 or ASTM D1653 greater than 0.4 perms; ASTM C672 Scaling resistance; ASTM C642 Water resistance; ASTM D968 Abrasion resistance; ASTM B117 Salt Spray Resistance; Chloride Ion Intrusion measured by AASHTO T259/260, NCHRP 244 Series II or NCHRP 244 Series IV, Southern Exposure; and a minimum of 2000 hours accelerated weathering testing per ASTM G152, G153, G154 or G155."
>
> Recommended VOC 400 grams per liter max, minus water.

Continuation of the Limit for Low Solids Coatings to 120 g/l: We agree with the District's change in the proposal to allow the continuation of the low solids coatings limit at 120 g/l.

17-6

Revisions to the Aluminum Roof Coatings Category: The limit would eliminate effective solvent borne aluminum coatings without any justification other than the assumption that lower VOC water borne aluminum coatings are as effective in all applications. This is a completely unfounded assumption. As an example, water borne aluminum coatings are completely inappropriate for metal substrates because they lack the requisite mechanical properties to adhere to these surfaces. Moreover, even for water borne aluminum coatings, the correct specification of aluminum content of .7 pounds per gallon that is needed for an effective coating along with the 100 gram per liter of VOC creates technical problems. The .7 pounds of aluminum paste material comes dispersed in mineral spirits of .35 pounds per gallon. Since aluminum water borne coatings are approximately 30% solids by volume, the introduction of the required .7 pounds of aluminum paste gives an inevitable VOC regulatory content greater than 100 g/l. Therefore, we recommend a VOC limit of 150 g/l for this coating.

17-7

Extension of Small Container Exemption, Under Consideration: Extending the small container exemption for clear wood finishes, including varnishes, sanding sealers, lacquers and pigmented lacquers until July 1, 2008 is a step in the right direction. As we indicated in earlier comments, We definitely believe that the elimination of the small container exemption for clear wood finishes is unjustified and should be dropped.
The quart exemption has played a major role in allowing manufacturers to provide coatings that meet consumer demand for higher performing products. This is evident in the higher sales of high VOC clear wood finishes in small containers where consumers have spoken with their pocketbooks in order to get the coating performance they need.

16-6 The idea that these new low-VOC technologies, which have yet to be tested in the mass consumer marketplace can replace all of the higher VOC clear wood finishes, which are currently being sold in small containers, is unfounded. There are numerous problems that will be caused by the implementation of this amendment. What about the touchup of existing clear coated wood surfaces? These new low VOC technologies are not compatible with many existing clear coated wood surfaces. Will consumers be forced to completely strip and recoat an entire wood surface [e.g. floor] in order to repair a small scratch or mar? If a consumer wants to touch up or refinish an old wooden table or chair [non-architectural objects] will he be forced to use only the low VOC clears? These are but a few of the questions that need to be addressed before any decision on the elimination of the small container exemptions is made

17-8 **Extension of Stain Effective Compliance Date, until July 1, 2007, Under Consideration**: Again we agree that this a is a step in the right direction but we also believe that the reduction in the VOC limit to 100 g/l will leave consumers with a limited choice of product with questionable performance characteristics, particularly for interior applications.

17-9 **Add Waterproofing Concrete Masonry Sealers to Small Manufacturer Exemption, Under Consideration:** The fundamental problem with the proposed limit for waterproofing concrete masonry sealers is that it is technologically infeasible to formulate the coatings at the level and have the materials perform as well in all of the diverse applications at issue. This fundamental reality is company-size neutral, and the exemption would merely allow smaller companies to escape it, while penalizing those which by company size would be ineligible for it. The problem lies in the limit itself, and this problem does not disappear simply on the basis of company size.

17-10 **Definition of Varnish:** We would like to request that the District revise the definition of "varnish" to reflect the new technologies for clear wood finishes that do not fit the current definition.

The current definition is:

> *"VARNISHES are clear wood finishes formulated with various resins to dry by chemical reaction on exposure to air".*

Two component clear wood finishes do not require exposure to air and thus do not meet the definitions for lacquers nor for varnishes.

We are request that the definition be as follows:

> *VARNISHES are clear wood finishes formulated with various resins to dry by chemical reaction. ~~on exposure to air.~~*

17-11 **Energy Star Certified Roof Coatings, Under Consideration:** The Energy Star Program is a program that contributes to reduction of air pollution by among, other things, encouraging the use of reflective roof materials which reduce the consumption of electricity used to cool buildings. The energy savings that can be secured through Energy Star roofing materials and the consequent reduction in associated air pollution are substantial. The suggested exemption for such coatings is counter productive to encouraging the wide spread use and development of such coatings. It must be recognized that some of these coatings are at VOC limits that exceed 100 g/l. Moreover, in order to qualify for designation as a an Energy Star roof material, a material must have at least three years exposure on roofs in order to judge whether it meets the criteria of the program. Consequently, in order for an Energy Star roofing material that exceeds the 100 g/l exemption to qualify for the exemption, it would first have to be reformulated to 100 g/l or less and go through the three year exposure testing. This would remove a great deal of incentive to participate in the exemption for manufacturers of such materials. A better approach would be to simply grant the exemption to all Energy Star roofs.

Sincerely,

Jim Sell
Senior Counsel
National Paint & Coatings
Association

Robert Nelson
Senior Director Environmental Affairs
National Paint & Coatings
Association

Comment Letter #18 – PROSOCO

Dear Mr. Russell,

18 I am writing on behalf of an architectural coatings Manufacturer, PROSOCO, Inc., regarding the South Coast Air Quality Management District Proposed Amended Rule 1113. Our detailed comment is forthcoming as PROSOCO has had inadequate time to review the latest revisions to the Proposed Rule. Here are the facts of the matter to the best our knowledge:

1. The current Proposed Rule revision is Version E.
2. As of this morning, Version E was unavailable through the District website or other electronic means.
3. Version E was released on October 16, 2003, giving 5 working days for review if and only if it had been available to commenters.
4. The District has stated in conversations with representatives of the National Paints and Coatings Association that is considering further revisions to Version E.

The unavailability and lack of District dissemination of Version E to the regulated community and other stakeholders makes it impossible for the public at large to present reasoned and informed opinions to the District. PROSOCO believes this constitutes a breach of the public trust by the District and a failure to exercise due diligence in the performance of its mission to create rationale regulations. We reserve the right to submit a detailed, substantive written comment once a FINAL draft of the Proposed Rule 1113 has been produced and disseminated, and given a reasonable period for technical review and comment.

Sincerely,

Dwayne M. Fuhlhage, CHMM
Regulatory Affairs Director

Comment Letter #19 – TCA

October 10, 2003

Mr. Dan Russell
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, CA 91765

E-mail: drussell@aqmd.gov

RE: Rule 1113 Amendments
Waterproofing Sealer – Concrete/Masonry Coatings

Dear Mr. Russell:

19-1 Textured Coatings of America, Inc. (hereinafter "TCA") is a small national paint and coatings manufacturer having factories in California and Florida. TCA is beginning its 43rd year in business as a company and has previously faced and had to deal with continued VOC regulations of this industry. I am president and CEO of TCA and personally attended workshops that were held regarding Rule 1113. TCA manufactures products that are designated as Concrete/Masonry Waterproofing Sealers. The proposed amendments are so important that we have attended every meeting in person, as well participating via teleconference from our offices in Florida. We also submitted comments, but were informed at the last industry work group that the staff did not have the time to go over these comments. It is truly amazing the rulemaking can go on, without the staff understanding the information industry has presented them.

19-2 The proposed amendments to Rule 1113 will virtually eliminate the specialty coatings categories for waterproofing sealers. When Rule 1113 was amended in 1999, a category was established for specialty waterproofing sealers made for concrete and masonry coatings. It was understood there was a difference in the performance and longevity of these specialty products, and a need for these coatings to exist. This includes not only the non-film forming silanes and siloxanes, but also the film-forming product my company manufactures, XL 70®. These materials meet rigorous testing required by the National Cooperative Highway Research Program, which mandates performance testing required for protecting the concrete.

19-3 We have looked at most the coatings included in the Appendix A to the modified rule, and the technical data for these zero or low VOC products listed under waterproofing sealers concrete/masonry coatings do not show these tests. In addition, we have reviewed the AVES report, which was used as reasoning for acceptance of the lowering of the VOC's of the waterproofing/concrete masonry category. Of the tests that are listed in the AVES document, only the water vapor transmission test is one that is used by federal, state and local agencies to specify waterproofing sealers for concrete and masonry. There are no other performance tests that are considered. The following is a list of tests that we typically run on our specialty waterproofing concrete masonry sealers.

CLEAR SEALERS

AASHTO T259/T260 Chloride Ion Content

D1683 Water Vapor Permeability

Florida Test Method 400-15.26(A), 50 cycles Freeze-thaw stability (other states have similar tests)

Skid Resistance - no change in Skid resistance (can't pass with a non-penetrating sealer)

NCHRP 244, Series II Chloride Ion Intrusion

NCHRP 244, Series IV Southern Exposure

ASTM C672 Scaling Resistance, 50 cycles

ASTM B117 Salt Spray Exposure, 300 hours minimum

PIGMENTED SEALERS

ASTM E-96 Water Vapor Permeability

19-3 AASHTO T259/T260, Chloride Ion Content

Federal Specification TTC-555B Alkali Resistance

ASTM D968 Abrasion resistance

ASTM C642 Water Absorption

ASTM C672 Scaling Resistance, 50 cycles

Federal Specification TTC-555B Wind driven Rain

ASTM D968 Falling Sand Abrasion Test, 2000 liters

ASTM B117 Salt Spray Exposure, 300 hours minimum

ASTM G153 Carbon Arc Weatherometer Exposure, 5000 hours minimum

The AVES report ran a freeze thaw test that is used to test acrylic coatings in the can for resistance to freezing. The freeze thaw test specified by state departments of transportation involves putting a concrete block coated with the sealer in a saline solution, cycling it between the saline solution and the freezer and checking for visual defects, cracking, etc. The chloride ion resistance tests are run to ensure that the coatings will resist commonly used highway chemicals.

19-3 Another major requirement is 5000 hours of weatherometer testing, with no visual defects. In addition, many Departments of Transportation require one to two years' exposure in the field prior to approval. None of the AVES tests involved accelerated or outdoor weathering, a critical performance factor for coatings.

While these tests are for federal and state DOT's, many architects specify these for high performance architectural coatings for concrete and masonry, as they are used to protect major commercial projects, such as office towers, commercial business parks, condominium complexes, etc., which involve large investments, that must be protected. Many California architects are convinced that protecting the exterior surface with high performance coatings protects the rebar, which is critical for building performance in the event of an earthquake.

19-4 In conclusion, keeping the higher limits for this specialty sub-category for concrete is consistent with the CARB Rule and is necessary to provide local, state and federal departments of transportation with these long-term performance products. The coatings we manufacture are specified by Departments of Transportation nationwide for the protection of concrete bridges due to the proven performance and low maintenance properties of the coatings. While we anticipate moderate growth in sales in this coating category, this category is a unique specialty coatings category that will not allow other products to be utilized within these categories to escape lower VOC requirements. Definitions could be changed to include critical testing required for inclusion in this category.

19-5 We respectfully request that you continue to keep the Concrete/Masonry Waterproofing Sealers as a separate category at 400 grams/liter. These are very unique coating categories that will never represent large volume emissions of volatile organic content within your region. This was the reason provided by the previous staff for creating this category in the first place. Based on the correct products that fall into this category they represent a minuscule amount of VOC's and therefore reducing and or eliminating this category for the above mentioned products would NOT result in any real emission reductions for the South Coast Air Quality Management District.

Please contact me regarding any additional information necessary to have this category included in the Rule 1113 Amendment. I would appreciate South Coast informing Textured Coatings of America, Inc. of whether you intend to include this subcategory in the amended Rule 1113.

Sincerely,

Jay A. Haines
President/CEO

Comment Letter #20 – Vista Paint

Vista paint Corporation
2020 E. Orangethorpe Avenue Fullerton, Ca 92831 714-680-3800

CALIFORNIA
BAY PARK
CATHEDRAL CITY
CERRITOS
CHULA VISTA
CORONA
COSTA MESA
EL CAJON
ENCINITAS
ESCONDIDO
FULLERTON
GLENDALE
HUNTINGTON BEACH
LA HABRA
LAGUNA NIGUEL
LAWNDALE
LONG BEACH
LOS ANGELES
MISSION HILLS
MISSION VIEJO
MODESTO
MORENO VALLEY
ONTARIO
ORANGE
ROCKLIN
RANCHO CORDOVA
RANCHO CUCAMONGA
RIVERSIDE
SACRAMENTO
SAN BERNARDINO
SAN DIEGO
SAN DIMAS
SAN JUAN CAPISTRANO
SANTA CLARITA
STANTON
TEMECULA
TUSTIN
VAN NUYS
VISTA
WEST LOS ANGELES
WOODLAND HILLS
NEVADA
HENDERSON
LAS VEGAS
SUMMERLIN

Tuesday, October 14, 2003 Re: 3.113

Dr. Laki Tisopulos
Assistant Deputy Executive Officer
SCAQMD
21865 E. Copley Drive
Diamond Bar, CA 91765

RE: Proposed Amended Rule 1113

Dear Laki:

At the last Working Group meeting, you requested the manufacturers present to submit written comments on our request to remove the "residential use" restriction on Industrial Maintenance Coatings. Your concern was that at earlier Rule Planning Meetings, "INDUSTRY" was concerned that a homeowner would be in extreme danger applying an industrial maintenance coating.

The current SCM, as well as the National AIM regulations require that all Industrial Maintenance Coatings be labeled with one of the following statements:

- Not for residential use.
- For Industrial use only
- For professional use only
- Not intended for residential use.

20

The purpose of these options being available to the manufacturer to label their product accordingly based on their knowledge of the health risks associated with their formulations.

At Vista Paint, we manufacture several coatings that are for use in the industrial maintenance arena. They are based on standard oil based and water based chemistry. They do not differ in health risks from our standard products that we sell as flats and/or non-flat enamels.

Because of this, we are asking you to reconsider the restrictions currently being proposed and eliminate the "not for residential use" restriction on IM coatings.

Thank you.

Cordially,

John H. Long
Sales/Store Control Manager

MANUFACTURERS OF FINE FINISHES SINCE 1954

Comment Letter #21

Approximately 40 Form Letters were Received with Similar Content as the Following

Barry R. Wallerstein, D.Env.
Executive Officer
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, CA 91765-4182

Dear Mr. Wallerstein:

I own a small business that installs and refinishes residential and commercial wood flooring in the South Coast Air Quality Management District. I recently learned that the District has proposed amendments to Rule 1113 that would eliminate the small container exemption for varnishes and lower the allowable VOC content to 275 grams per liter. This would effectively ban the solvent-based oil-modified polyurethane finishes used by my company to protect wood flooring in most applications.

The current rule limit of 350 grams per liter for varnishes has resulted in products with inferior application, handling and initial performance characteristics. To achieve satisfactory results I have relied on the small container exemption to legally obtain products that meet the application, handling, appearance and performance needs of my business and the demands of the homeowners and building owners who are my customers.

21

I am grateful for the District's successful and continuing efforts to improve the quality of our air and I support rules that balance environmental and practical needs, but I object to any amendment to Rule 1113 that would eliminate the small container exemption or further limit the VOC content of varnishes. Such rulemaking would cause irreparable harm to my business and reputation.

On behalf of my customers and fellow employees, I respectfully request that you consider the damage that would result from such an impractical rule and take the necessary steps to preserve the existence of products critical to my business, at least until adequate replacement products can be produced. There will also be a need for solvent-based varnishes in the future to handle touch-up and repair of surfaces previously finished with solvent-based varnishes. Rule 1113 needs to assure that these products will continue to be available.

Sincerely,

RESPONSES TO COMMENTS:

13-1 Both the Draft Staff Report for Proposed Amended Rule 1113 and the CARB 2001 Architectural Coatings Survey explain in detail where the agencies obtained the sales volume data and how the emission inventory is calculated. In short, the sales volume and VOC content for all coating categories is provided to CARB by the manufacturers of these coatings. When this data is totaled, the California sales volume for architectural coatings was 98,455,172 gallon in 2000 with emissions of 128.3 tons per day including thinning and cleanup solvents.

13-2 Staff has conducted an extensive technical review of the coating categories proposed to be amended and found numerous coatings in each category that are at or below the proposed VOC limits and are currently being marketed, sold and applied, and exhibit equal, and in some cases superior, performance than their higher-VOC counterparts. Staff conducts site visits to observe these coatings and interview application contractors and owners as to the satisfaction of the coatings. In addition, side-by-side testing with high VOC products has been conducted with the results showing that low-VOC products usually work as well and often exceed the performance of the higher-VOC products. The cost-effectiveness of the proposal ranges between $4,229 and $11,405 per ton of VOC reduced, and is within the adopted guidelines of the AQMD Governing Board. The low-end of the range is from products that are currently on the market, and staff obtained current cost figures from the manufacturers. Based on performance of these low-VOC coatings, massive paint failures have not occurred nor expected when the application is based on the manufacturers' recommendations and proper surface preparation.

13-3 It is true that there are a lot of people within the AQMD jurisdiction and the more homes and businesses that are built the more architectural coatings are used for both existing buildings and new construction. Staff recognizes that the largest source of air pollution in the South Coast Air Basin comes from mobile sources; however, architectural coatings are the largest source of VOC emissions and there is available and cost effective low-VOC technology that if used exclusively will reduce emissions. For your information, architectural coatings are not considered to be consumer products in the State of California, and therefore are regulated by individual air districts, including the AQMD. Staff is interested in obtaining additional suggestions from the public regarding sources of air pollution and subsequent inclusion in future AQMPs.

14 The commenter states that the "residential use" restriction of industrial maintenance coatings was removed from the CARB Suggested Control Measure (SCM) as adopted by other California local air districts. Both the federal rule for architectural coatings, 40 CFR, Subpart D, Section 59.405 and the CARB Suggested Control Measure (SCM) specify that each manufacturer and importer of any industrial maintenance coating display on the label or lid of the container one or more of the following: (1) "For industrial use only.", (2) "For professional use only.", (3) "Not for residential use" or (4) "Not intended for residential use." The AQMD rules cannot be less restrictive than the federal or state rule. Even if the restriction of using industrial maintenance coatings for residential use were removed from Rule 1113, the labeling would be confusing to consumers if on the one hand the label specifies the product is for industrial maintenance

use and on the other hand it says for residential use. It is true that the rust preventative category does have a higher VOC limit than the industrial maintenance category, however if a coating is formulated and intended for use as a rust preventative coating that is how the product should be labeled not as an industrial maintenance coating that could be a substitute coatings. If a manufacturer develops an industrial maintenance coating based on the same formulations as other residential products, then the product should meet the lower-VOC limits for a flat or nonflat, not the higher VOC limit for the industrial maintenance category. Additionally, staff has not received written comments from all parties that raised concerns about safety and substitution during the 1999 rulemaking. Lastly, the National Paint & Coatings Association, as a part of their comments on the Draft Environmental Assessment, also included concerns regarding safety of some coatings for consumer uses. Therefore, staff believes that there is a continued need for the residential use restriction of industrial maintenance coatings. Also see response #6-6.

15 The coating category “pre-treatment wash primers” is defined in Rule 1113 as a coating containing a minimum of ½ percent acid, by weight, applied directly to bare metal surfaces to provide necessary surface etching. Etching of metal surfaces allows for better adherence for subsequent coatings. The definition of a pretreatment wash primer for Rule 1107 - Coating of Metal Parts and Products and for Rule 1151 - Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations is similar in requiring a minimum of ½ percent acid, by weight but also limits the percent solids content as well as allowing the coating to be applied directly to the metal to provide corrosion resistance, adhesion and in Rule 1107, ease of stripping. The VOC limit for architectural coatings controlling corrosion resistance would fall under other architectural coating categories such as “industrial maintenance coatings” or “zinc-rich industrial maintenance coatings: with a lower future VOC limit of 100 g/l rather than the 420 g/l liter VOC limit for architectural pre-treatment wash primers. Therefore, staff did not propose amendment of the definition of “pre-treatment wash primers”.

16-1 Staff has conducted an extensive technology assessment and concluded that numerous, well performing products are available and in use that comply with the proposed VOC limit of 50 g/l. On July 31, 2003, Rule 1113 staff met with five roof coating manufacturers and a representative of the roofing union association at AQMD Headquarters. Given the input from these coating manufacturers, it was agreed that a standard of 50 grams of VOC per liter, less water was the most environmentally friendly, occupant friendly, solution that also complied with Title 24 and could be applied to a wide range of roofing substrates. Some manufacturers cautioned that low VOC roofing products might not be feasible in other areas where the climate is less favorable than typically found in the AQMD. Additionally, bituminous roof primers that are used in areas with dirt and a have a VOC limit of 350 g/l are not included in this proposal.

16-2 After discussion with roof coating manufacturers, staff proposes that, effective January 1, 2005 through December 31, 2006, roof coatings that are USEPA Energy Star certified and with a VOC content of 100 grams per liter or less, be exempt from the proposed VOC limit in the Table of Standards.

17-1 See response 6-5. Furthermore, staff has referenced the publicly-available manufacturers' testing data in the staff report, providing access to all interested parties. Additionally, the site visit reports were made available to the Technical Advisory Committee, and any other interested party, in early November 2003.

17-2 Staff's technical assessment shows that several manufacturers have indicated that they sell the same products, especially clear wood coatings, for shop and field finishing. SDA/Craft Technologies, a local manufacturer of compliant clear wood coatings, indicates that the same product is sold to the wood shops and field finishers, and is preferred by field finishers for lower odor, lower flammability, and superior performance. The commentator also does not provide any support for the notion that the lower-VOC clear wood coatings are not as easy to apply. Staff's assessment shows that lower-VOC clear wood coatings are applied using the same type of application methods (wiping for interior stain, brushing or spray) used to apply higher-VOC products. The commentator also indicates that the AQMD recognizes that low-VOC products do not apply as easily and therefore has limited the residential use of industrial maintenance coatings. The commentator does not consider why the residential use restriction was placed on industrial maintenance coatings. The commentator is encouraged to review the environmental assessment from past rulemaking, which clearly indicates that the AQMD restricts use of industrial maintenance coatings in residential environment not because of their supposed difficulty in application, but due to the potential health concerns of spray application of lower-VOC, two-component urethane coatings, an issue introduced by the industry for industrial maintenance coatings category in past rulemaking. Staff believes that transfer of technology for shop coatings is possible and already underway by a variety of manufacturers of clear wood coatings, based on letters forwarded by these manufacturers that indicate that the same product used in a shop environment is used for field application.

17-3 Staff believes that the lower-VOC products listed in Appendix A are viable alternatives to products currently sold in the district. These products are currently available and are recommended for the same uses, with similar performance characteristics (i.e., they meet KCMA, NHCRP, etc. standards) as their higher-VOC counterparts. Therefore, there is no basis to conclude that these products, if not already sold in the South Coast, would not be viable products for their recommended uses in the shop and field. Appendix A is not intended to be all-inclusive, but merely a demonstration of the availability of compliant products with similar performance characteristics as their higher-VOC counterparts. Just because the deadline for attaining ozone standards is not until 2010, does not mean that the people living in the AQMD jurisdiction should not have cleaner air, especially if the lower emitting products are commercially-available and currently in use. Staff does not consider the proposed limits to be technologically infeasible, as the commentator suggests. The coatings included in Appendix A and discussed in the staff report are at or below the proposed VOC limits, commercially-available, and in use today. However, based on comments from industry, including your initial comment letter, staff extended the initially proposed implementation date to July 1, 2006, which is also similar to the proposed implementation dates in Comment Letter #1. This time extension, as mentioned in your initial letter, provide ample time for to reformulate, test in the laboratory, and conduct the field testing necessary prior to commercialization.

17-4 Staff is responding to this comment with the assumption the commentator is talking about waterproofing concrete/masonry sealers rather than the category waterproofing sealers. In addition to staff revising the proposal to raise the VOC limit from 50 g/l to 100 g/l, the proposed effective date is extended to July 1, 2006 giving an additional 18 months to those manufacturers requiring additional time to reformulate, test, and commercialize their products to meet the new proposed VOC limit. Appendix A includes a comprehensive list of penetrating and film-forming waterproofing concrete/masonry sealers that meet the diverse application and meet or exceed the performance requirements of this category. If a separate category were created for high performance waterproofing concrete/masonry sealers it would be next to impossible to verify compliance during application, even if the use specifications were included in the definition and on the container label. See Responses to Comments #10-2 and #10-3 for additional technical discussions on available compliant products.

17-5 See response 1-2.

17-6 Manufacturers have told staff that their waterborne aluminum roof coatings are used on metal roofs, both with and without primers depending upon the condition of the metal substrate. If the metal is rusted, a primer coat is usually recommended. New metal roofs are normally reflective and allowed to weather prior to being coated. The weathering process reduces the oils that might be on the metal roof substrate preventing adhesion of the coating. The manufacturers will only provide a warranty for either solventborne or waterborne aluminum roof products if the applicator meets specific substrate preparation and subsequent coverage rates. The technical data sheet (Appendix E) for Tropical Asphalt's #113 Hydro-Aluminum roof coating recommends the product for metal as well as other roof substrates. This product is formulated at 100 g/l. Gardner-Gibson produces #400 Sunbrite Aluminum roof coating with a maximum VOC of 5 g/l. The numbers you cite may make it difficult to formulate coatings to 100 g/l; however, the volume of water, the solids content and VOC ratios can be adjusted. Other manufacturers make waterborne aluminum roof coatings with a VOC content near the proposed VOC limit of 100 g/l and told staff with minimal reformulation such as using exempt solvents they will be able to meet the proposed VOC limit.

17-7 Staff has included two versions of Proposed Amended Rule 1113, one version that eliminates the small container exemption by July 1, 2006 and the other version by July 1, 2008, and in the interim establishes a VOC limit of 450 g/l for varnishes and sanding sealers and 550 g/l for lacquers. See response #6-8 for additional discussion.

17-8 See response # 9-5. Staff is proposing to lower the VOC limit for exterior stains only, not the interior stains which has a current VOC limit of 250 g/l.

17-9 Staff believes that the proposed VOC limit of 100 g/l is feasible based on the availability of compliant products available and sold (Appendix A), as well as comments received from other commentators (Comment Letter #1). Appendix A lists numerous manufacturers and products that comply with the proposed limit of 100 g/l, indicating the availability of a variety of resin systems, including acrylics, epoxies, and urethane-based waterproofing concrete/masonry sealers. These products represent a variety of uses, including concrete driveways, pool decks, vertical concrete block walls, concrete tilt up walls, and exposed aggregate. The list also includes products recommended for above-grade and below-grade, as well as interior and exterior uses. Lastly, there are several penetrating sealers that meet the DOT requirements, as tested under the NCHRP 244 tests. The AVES study includes a side-by-side comparison of acrylic, alkyd, and epoxy-based sealers that clearly shows the superior performance of the zero-VOC epoxy-based waterproofing concrete/masonry sealer compared to the alkyd- and acrylic-based sealers. Lastly, the availability and use of these products clearly demonstrate that these products perform well, especially since they are being used in the absence of any regulatory requirements. The small manufacturer exemption will allow additional time for these companies to reformulate their products, since they do not have the facilities for research and development of large manufacturers, and have requested additional time for reformulation.

17-10 By removing "on exposure to air" from the definition of a varnish, staff would be changing the long-standing definition for this coating category. The current definition requires oxidation as part of the curing process for the product to be defined as a varnish, which is more encompassing than the requested definition, which would limit this category to two-component products. All clear wood finishes including lacquers, sanding sealers and varnishes will have the same VOC limit in the future upon adoption of the proposed amendments making the distinction between these products meaningless for air quality purposes. In the future when the VOC limits are the same, staff could remove the definitions for lacquers, sanding sealers and varnishes and maintain the larger category clear wood finishes.

17-11 Staff is proposing to extend the implementation date for roof coatings certified under the USEPA Energy Star Program and with a VOC content of 100 g/l or less. See response # 15-2. Staff does recognize the importance of reflective roof coatings and their contribution to air quality through the reduction of energy used to cool buildings. During the technology review, staff found at least 10 manufacturers (some with multiple products) of energy star approved roof coatings that currently meet the proposed 100 g/l exemption.

18 This response is in regard to an e-mail for Prosoco. As of the writing of this response staff has not received a written comment letter as stated in the e-mail.

See response #6-2. The process of disseminating different proposals for rule amendments occurs through public meetings during rule development. For those individuals (152) that have requested to be placed on our e-mail list, staff provides proposed amendments as soon as possible prior to meeting. Proposed Amended Rule 1113, Version E was a revision to add a definition for aluminum roof coatings and establish a 100 g/l for this new category after receiving input from the regulated community. Also, during the Public Consultation Meeting staff advised the public of the following proposals under consideration: Extension of the small container exemption to July 1, 2008 with VOC limit caps between 350-450 grams per liter; extension of the effective compliance date for stains to July 1, 2007; adding the category waterproofing concrete/masonry sealers to the small manufacturers exemption; and extension of the effective date for compliance of energy star certified roof coatings, at 100 grams per liter or less, to January 1, 2007. All changes made to the proposed rule before and after the Public Consultation Meeting were included in the Draft Staff Report and Proposed Rule set for public hearing on November 7, 2003, and were made available to the public on November 4, 2003. In addition, all those on the Working Group mailing list were provided an electronic copy of the Proposed Rule and Draft Staff Report.

19-1 See response #10-1

19-2 See response #10-2

19-3 Low-VOC technology has been developed that meets all the performance requirements for waterproofing concrete and masonry sealers at the proposed VOC limit of 100 g/l. Appendix A of the Draft Staff Report lists penetrating and film-forming waterproofing concrete/masonry sealers that meet or exceed the performance standards listed in the National Cooperative Highway Research Program (NCHRP) 244. The commentator lists typical tests performed on waterproofing concrete/masonry sealers, which several of the products listed in Appendix A also pass. The AQMD evaluates the industry as a whole, and data shows that there are several low-VOC (< 100 g/l) products that meet the listed characteristics. The silane/siloxane waterproofing concrete masonry sealers, especially the alkyl alkoxy silanes, are extensively used in highway projects by state departments of transportation (DOT's) throughout the U.S. Their main purpose is to prevent water, chloride ion, CO_2 and other chemicals' permeation to the steel structure under the poured concrete, thus protecting it. These coatings generally have to meet several tests, outlined in National Cooperative Highway Research Program (NCHRP) 244 and federal specification SS-W-110C, in order to be approved for use by the DOT's. According to CalTrans, which staff has contacted regarding these coatings, the only current requirement for approval is that the coating has to be a 40 percent silane/siloxane solution and it has to meet local air quality standards. The AVES Study analyzed only a subset of these tests, for which the zero-VOC product performed comparable, and in some characteristics, better than the solvent-borne waterproofing sealers used on concrete/masonry substrates. However, the information obtained from manufacturers and presented in the staff report clearly shows high performance of penetrating and film-forming waterproofing concrete/masonry sealers.

19-4 Appendix A lists numerous penetrating and film-forming waterproofing concrete/masonry sealers. Specifically, POLY-CARB's MARK-163 is a zero-VOC film forming sealer used by DOT's of states with more inclement weather than Southern California, including Ohio, North Carolina, Alabama, and Illinois. See response #10-6 for additional discussion.

19-5 See response #10-7.

20 The response is in relation to the request to eliminate the restriction of industrial maintenance coatings for residential use. See responses #6-6 and #14.

21 Staff disagrees with the commenters that the current VOC limit of 350 g/l and the proposed VOC limit of 275 g/l will result in products with inferior application. Please refer to comment letter #12 from BonaKemi, a floor coating manufacturer. Furthermore, the AVES Study clearly illustrates the ability of the low VOC varnishes, sanding sealers, and lacquers to replace existing high VOC products for initial coating, as well as touch-up and repair. Staff believes that the lower-VOC products listed in Appendix A are viable alternatives to products currently sold in the district. These products are currently available and are recommended for the same uses, with similar performance characteristics (i.e., they meet KCMA, NHCRP, etc. standards) as their higher-VOC counterparts. Therefore, there is no basis to conclude that these products would not be viable products for their recommended uses in the shop and field. Appendix A is not intended to be all-inclusive, but merely a demonstration of the availability of compliant products with similar performance characteristics as their higher-VOC counterparts. Staff does not consider the proposed limits to be technologically infeasible. The coatings included in Appendix A and discussed in the staff report are at or below the proposed VOC limits, commercially-available, and in use today. However, based on comments from industry, staff extended the initially proposed implementation date to July 1, 2006, which is also similar to the proposed implementation dates in Comment Letter #1. This time extension provides ample time for reformulation, testing in the laboratory, and conducting the field testing necessary prior to commercialization.

Staff research shows that varnishes, stains, and lacquers are sold in small container not because of their superior performance, but for the reason that most consumers use them for small projects, such as bars, tabletops, etc. Staff is proposing to delete the small container exemption for clear wood coatings, effective July 1, 2006. However, in response to comments, staff is also considering an alternate proposal that phases out the exemption and in the interim establish maximum VOC limits for coatings in those small containers. Specifically, the exemption would be deleted effective July 1, 2008 and in the interim, the maximum VOC limit for varnishes and sanding sealers sold in small containers will be 450 g/l, and 550 g/l for lacquers.

A P P E N D I X E

TECHNICAL DATA SHEETS AND MATERIAL SAFETY DATA SHEETS

APPENDIX E – TDS AND MSDS

This appendix contains the Technical Data Sheets (TDS) and Material Safety Data Sheets (MSDS) for those products cited in Chapter III – Control Technology.

BonaTech MEGA® Brand Floor Finish
X-6697 Semi-Gloss Aquathane Waterborne Floor
275 Multi-Purpose Ultra Clear Urethane
355 Waterborne Acrylic Varnish
WOODPRIDE™ Interior Waterborne Aquacrylic Gloss Varnish
Geocel 9500™MB – Elastomeric Coating for Metal Buildings
Roof Mate The Roof Preservation System
Roof Mate High Solids 100% Acrylic Elastomer
Tropical Asphalt #113 Hydro-Aluminum
Tropical Asphalt #360 Asphalt Emulsion
ProMar® Exterior Solid Color Acrylic Latex Stain A16 Series
4301 Exterior Acrylic Solid Color Rustic Stain
ACRI-FLAT® W 704
Okon DECK STAIN, OK-720
Woodtech Solid Color Pre-Stain, 09-870
Kemiko Transparent Stain
Best Grade 105 Wiping Stain
ZVOC® Exterior Waterbased Stain
ACRYLASTIC 490
THOROCOAT® DOT
EVERCOAT 7000S High Modulus Waterproof Coating
VIP1550 CONCENTRATED WATER REPELLANT
Aquapel & Aquapel Plus
Blok-Lok® Clear Water Repellent
ConFlex XL Texture High Build, A5-800 Series
Clear Elastomeric Waterproofing Sealer (2571-70)
TK-1311WB Silane Concentrate

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ConFlex XL Texture High Build, A5-800 Series
Clear Elastomeric Waterproofing Sealer (2571-70)
TK-1311WB Silane Concentrate

Bona

Mega™

DESCRIPTION:

MEGA is the revolutionary, oxygen-crosslinking, waterborne wood floor finish for use on heavy-traffic interior residential and commercial floors.

MEGA's unique OCP (Oxygen-Crosslinking Polyurethane) formula uses the oxygen in the air as the crosslinker. MEGA is the world's leading waterborne finish, providing exceptional durability, beauty and value.

FEATURES:

- Oxygen-crosslinking, 100% polyurethane waterborne formula with extraordinary performance, ease of application and durability
- No limited pot life and no wasted finish
- Natural wood color enhances the beauty of the wood
- Exceptional build and clarity
- Excellent flow and leveling
- Available in gloss, semi-gloss or satin
- VOC compliant - VOC does not exceed 250 grams per liter
- Fast drying - Approximately 2-3 hours
- Nonflammable and virtually odorless
- Water clean-up

RECOMMENDED USE:

- Heavy-traffic residential—kitchens, entry ways, family rooms, homes with pets, children and high foot traffic
- Commercial—restaurants, offices, retail stores
- Hospitals, schools and universities, nursing homes

ENVIRONMENTAL CHOICE ®

DIRECTIONS FOR USE:

BEFORE USING, READ ALL DIRECTIONS AND MATERIAL SAFETY DATA SHEET #80060 (GLOSS) OR #80063 (SATIN AND SEMI-GLOSS) FOR THIS PRODUCT.

MEGA™ is the Environmental Choice. The Environmental Choice® Seal is a registered trademark of BonaKemi USA, Inc. and represents a waterbased formula which meets or exceeds all state and federal clean air quality standards. Available in Gloss, Semi-Gloss or Satin. Nonflammable.

NOTE: MEGA finish will appear slightly amber on white, bleached or pastel floors. Always prepare a sample or test area to determine actual appearance. For a colorless finish on these types of floors, use Bona Strong™ or Traffic™ brand floor finish.

Use directly from container. Do not thin. Non-photochemically reactive (Not an ozone precursor). KEEP FROM FREEZING.

RECOATING EXISTING FLOORS 1. Be sure floor is free from wax or oily residue. **2.** Use Bona Prep™ system (see label for directions). **3.** Apply 1-2 coats of Mega (see finish directions).

NOTE: Mega will adhere to most stains and finishes after proper preparation and dry times. **Always prepare a sample or test area to determine compatibility.**

SANDING AND FINISHING NEW FLOORS 1. Sand and prepare floor using NOFMA-accepted methods. **2.** For a stained floor, make your final cut with 80-grit paper and screen with 80 - 100-grit screen. Apply Bona® DriFast™ Stain. For an unstained floor, make your final cut with 80 - 100-grit paper and screen to 120 - 150 grit. This burnishing will reduce the amount of grain raise. **3.** Use Tampico Brush on buffer and vacuum thoroughly. **4.** Tack with a dry Bona® microfiber mop or cloth. **5.** Apply sealer and finish system (see finish directions).

THE MEGA SYSTEM IS A 3-COAT SYSTEM: 1 coat Bonaseal® (the use of Bonaseal® minimizes the possibility of sidebonding and tannin bleed) and 2 coats of MEGA. Adding a third coat of finish is recommended in heavy-traffic commercial and residential areas.

NOTE: Use a clean applicator for sealer and a separate clean applicator for finish.

INTERCOAT ABRASION: Abrading between sealer or finish coats is not necessary for adhesion unless it has been more than 48 hours since the previous coat has been applied. However, for smoothest results, abrade the Bonaseal® sealer coat with a Bona® Conditioning Pad and 2 siafast Delta Sheets to eliminate any grain raise. The Delta Sheets are to be used for abrading Bonaseal® only. Abrade prior to the final finish coat with just the Bona® Conditioning Pad. **Always vacuum and tack thoroughly with a slightly water-dampened Bona® microfiber mop or cloth after abrading.**

FINISHING: SHAKE WELL BEFORE USING. 1. Pour a 4" wide line of the finish along the starting wall. Go with the grain of the wood. **2.** Using a clean, pre-dampened applicator, draw the applicator forward, with the grain of the wood, moving the finish toward the opposite wall. Holding the applicator at a "snowplow" angle will maintain a wet edge at all times. **3.** At the end of each run, turn the applicator toward you and pad out the applicator parallel to the wet edge. **4.** Feather out all turns. If pushed too hard or too fast, drips will fly off the applicator. **5.** Missed areas can be touched up if seen right away. **6.** To prevent lapping and dry marks, be sure you are using the recommended coverage of 500-600 sq. ft. per gallon. Be careful not to spread the finish too thin. **7.** Allow your first coat to dry 2-3 hours. High humidity and/or low temperatures will extend the drying time. For smoothest results, before applying final coat, abrade with a Bona® Conditioning Pad. **Always vacuum and tack thoroughly with a slightly water-dampened Bona® microfiber mop or cloth after abrading. Allow final coat to dry at least 48 hours before use.**

CURING: The curing process takes approximately 7 days. Do not replace area rugs until the floor has fully cured. The floor may be walked on after 24 hours, but the floor is susceptible to scuffing or marring prior to completion of the curing time. Do not use cleaner during this 7 day curing time. Use only a dry Bona® microfiber mop or cloth for cleaning during the first week.

CLEAN-UP: Tools should be cleaned with water and stored in the Bona® Applicator Storage Canister.

MAINTENANCE: Put walk-off mats at all entrance doorways to keep out excessive dirt and grit. Sweep or vacuum daily and damp wipe as needed with Bona® Swedish Formula® Hardwood Floor Cleaner.

SPECIFICATIONS/PHYSICAL DATA:

Physical Characteristics:

Ingredients: Gloss - Water, polyurethane resin, N-Methyl-2-Pyrrolidone and Dipropylene Glycol Monopropyl Ether.
Satin and Semi-Gloss - Water, polyurethane resin, N-Methyl-2-Pyrrolidone, Dipropylene Glycol Monomethyl Ether and flattening agent.

Color - Milky white (wet) **Odor** - Non-offending **pH** - 7.9
Stability - 1 year shelf life in unopened container **Solids** - 32.5% **Viscosity** - (#4 Ford cup @ 25° C) 18 seconds
Density - 8.75 lbs./gallon (1.05 S.G.) **Gloss Level (60°)** - >90 for gloss, 40-45 for semi-gloss, 25-30 for satin
VOC Compliant - Does not exceed 250 grams per liter (2.1 lbs. per gallon VOC)

Application Characteristics:

Clarity - Clear when dry **Coverage** - 500-600 square feet per gallon
Leveling - Excellent **Defoaming** - Excellent
Drying Time - 2-3 hours **Percent Cured After 24 Hours** - 70%
Maximum Cure - 100% after 1 week
Application Tools - Bona® Brush, flocked foam Bona® Swivel Head Floor Coater, Bona® Swedish Roller
Packaging - 1-gallon plastic bottle

BonaKemi USA, Inc.
14805 E. Moncrieff Place, Aurora, CO 80011-1207 • (303) 371-1411 • (800) 872-5515 • FAX (303) 371-6958 • www.bonakemi.com

FARWEST PAINT PRODUCT INFORMATION

Varnish Coatings

X-6697 Semi-Gloss Aquathane Waterborne Floor Finish

COLOR(S): Clear and Tints.

PRODUCT TYPE: Modified Aliphatic Urethane Dispersion.

DESCRIPTION: A waterborne, easy-to-apply complete wood finishing system. Grain raise and dry finish are not a problem and, in most cases, stain and finish may be recoated within one hour or less. The solids content in this system is higher than conventional nitrocellulose lacquers or oil-based stains making film build and aesthetic looks better than conventional systems. This is a high quality aliphatic urethane which is non-yellowing, highly durable and stain resistant.

Intended Use: Primarily designed as a high abrasion resistant coating for hardwood floors; but is widely used for kitchen cabinets, coffee tables, fine wood furniture, table tops, clear wood trim varnish, etc.

PHYSICAL CHARACTERISTICS

VISCOSITY: 13-17" (FORD #4)

DRY TO TOUCH: 30-45 minutes

WEIGHT SOLIDS: 30-32%

TACK FREE: 2 hours

VOLUME SOLIDS: 26-28%

TIME TO RECOAT: 3 hours

WEIGHT PER GALLON: 8.50 lbs. per gal.

DRY HARD: 3 hours

V.O.C.: 186 grams per liter

COLOR RANGE: Clear and Tints

FLASH POINT: N/A.

PACKAGING: 1 or 5 gallon containers

BATCH: Stock

PRACTICAL COVERAGE: 250-350 square feet per gallon depending on surface to be coated.

SURFACE PREPARATION: The surface to be coated must be clean, dry and free of oil, dirt and grease. For best results, the surface should be thoroughly smooth sanded before applying the first coat of color or finish.

APPLICATION:

Farwest Paint Manufacturing Co.
4522 South 133rd Street
Tukwila, Washington, 98168
http://www.farwestpaintmfg.com

Material Safety Data Sheet
For Coatings and Related Materials
Prep: May 1989 **Update:** Apr. 1999

Sections I-IV (This Page) / Sections V-X (Click Here)

24 Hour Emergency Assistance
Emergency (Chemtrec) (800) 424-9300
Information (Farwest) (206) 244-8844

Section I - Product Identification

Product Number: X-6697

Product Name: Aquathane Clear Semi-Gloss Waterborne Finish

Product Class: Waterborne Lacquer

Hazard Rating		*This Product*
0	Lowest	Health: 2
1	|	Flammability: 1
2	|	Reactivity: 0
3	|	Personal Protection: B
4	Extreme	

Section II - Hazardous Ingredients

Ingredient	*CAS Number*	*Percent (By Weight)*	*Occupational Exposure*	
			TLV (ACGIH)	*PEL (OSHA)*
1-Methyl-2-Pyrrolidone N-Methyl Pyrrolidone	872-50-4	3.6%	100ppm	100ppm
Ammonia	1336-21-6	0.5%	25ppm	25ppm
Ethylene Glycol Monobutyl Ether	111-76-2	8.4%	25ppm	25ppm
N,N-Diethylethanmine Triethylamine	121-44-8	0.85%	10ppm	25ppm

"Pursuant to Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and 40 CFR Part 372, this product contains or may contain a toxic chemical in a quantity subject to the reporting requirements under Section 313"

Section III - Physical Data

Boiling Range: 192-396 F.
Weight/Gallon: 8.50 lbs.
Vapor Pressure: 8.5mmHg@20C
Vapor Density:
Heavier than Air: XX
Lighter than Air:
Evaporation Rate:
Faster than Ether:
Slower than Ether: XX
Percent Volatile by Volume: 73%
Solubility in Water: Infinite
VOC: 186 Grams/Liter (Less Water)
pH: 8-9
Reactivity in Water: NIL
Appearance: Clear viscous liquid with an alcoholic, ammonia odor.

Section IV - Fire and Explosion Hazard Data

Flammability Classification:
OSHA: Non Flammable
Class: Not Restricted
DOT: Non Flammable
Flash Point: N/A
LEL: N/A **UEL:** N/A
UN Number: 1263

Extinguishing Media: Foam, CO2, Dry Chemical, or Water Fog.
Use the above or any Class B extinguishing agent. Water may be unsuitable as an extinguishing medium, but helpful in keeping adjacent containers cool.
Special Firefighting Procedures: Firefighters and others exposed to vapors or products of combustion should wear self-contained breathing apparatus. Evacuate area of unprotected personnel. Wear protective clothing.
Unusual Fire and Explosion Hazards: Vapors may form an explosive mixture in air and may be ignited by sparks, pilot lights, etc. Closed containers may rupture when exposed to extreme heat.

FUHR
International, LLC.
Specialty Paint &
Wood Coatings

High Quality Water based
Wood Finishes

Product Series Number:
275

Multi-Purpose Ultra Clear Urethane

Summer 2002

A water based self-sealing, self- cross linking, modified urethane finish for use on various substrates requiring a very high quality finish. Substrates including tile, concrete, and various wood species. 275 was first designed for hardwood flooring applications, offering superior overall durability and buff ability. Its high quality performance has also proven to be a good choice for use on high end furniture, passage doors, millwork, windows and cabinetry when a true clear urethane is necessary. Typical dry time to touch in ambient conditions is 10 minutes, light handling in 15 minutes and sand able in 30 minutes. Use this product for both the sealer and finish application for best results. Sanding between coats with 320 grit (or higher) sandpaper is required for maximum quality and adhesion. 275 is compatible with most finish techniques & equipment.

PRODUCT DATA & SPECIFICATIONS

Appearance & Odor:	Clear liquid, mild odor	**VOC content by #:**	1.00 #/gallon
Evaporation Rate:	Slower than ether	**VOC content by G/l:**	120 Grams / liter
Solubility in Water:	Soluble	**VHAP content:**	1.00 #/gallon
Specific Gravity:	< 1.04	**# VOC/gal solids:**	3.32
Weight per Gallon:	8.68 #	**Flash Point:**	Non-combustible
Solids by Weight:	33 %	**Flammability:**	Not applicable
Solids by Volume:	30 %	**Viscosity:**	# 4 Zahn Cup, 15-18 seconds

Substrate Preparation: As a Sealer: surface should be pre-sanded with 220 grit abrasive and cleaned of any dust, dirt, etc. As a Finish: surface should be sealed and sanded with 320 grit or higher abrasive and cleaned of any remaining dust.
Application: Apply in wet coats measured at approximately 2-5 wet mils.
Cleanup: Flush all equipment with water both before and after use of 275. Build-up may be removed with a cleaner solution such as 330 Universal Cleaner & Stripper. Flushing with water is necessary after the use of any cleaning agent to avoid contamination.

Featured Benefits

*** Fast Dry * Low VOC * Superior Durability * Brush able & Wipe able * Buff able ***
*** High Solids * Water Clean-Up * Self-Sealing * Easy Application * Meets KCMA ***

1-800-558-7437
Fuhr International, LLC
P.O. Box 86
Wingan, MO 63566
www.fuhrinternational.com

MATERIAL SAFETY DATA SHEET

Multi-Purpose Ultra Clear Urethane Series # 275

Section I. Manufactured By

Fuhr International
64664 Woodburn Drive, Winigan, MO 63566

Emergency Telephone: 800-558-7437
Information Telephone: 660-857-4301
Preparation Date: 05-01-2003

Section II. Hazardous Ingredients	PEL	TLV
N-Methyl-2-Pyrrolidinone;		
CAS #: 872-50-4	100 ppm	100 ppm
Triethylamine		
CAS #: 108-01-0	10 ppm	10 ppm
Urethane Polymer		
CAS #: Proprietary	NE	NE
Ethylene Glycol Butyl Ether		
CAS #: 111-76-2	NE	NE
Diethylene Glycol Butyl Ether		
CAS #: 112-34-5	NE	NE

Section III. Physical Data

Boiling Point:	212 F
Specific Gravity (H_2O=1):	1.04
Vapor Pressure (mm Hg.):	Approx 23 mbar @ 20 C
Melting Point:	Variable
Vapor Density (Air=1):	Greater than 1
Evaporation Rate (Butyl Acetate=1):	Slower than ether
Solubility in Water:	Dilutable

Appearance and Odor: Milky white liquid. Mild odor. ph 7-9
VOC Content: (Method ASTM D3960-02-section 10.4)
TOTAL 1.36 # per gallon = 163 grams/lt
VHAP Content: 1.00 # per gallon = 120 grams/lt
Weight per gallon: 8.68 # / gallon
Solids by Volume: 30 %
Solids by Weight: 33 %
Viscosity: 15 - 18 seconds # 4 Zahn Cup
#VOC/ Gallon Solids 3.32

Section IV. Fire and Explosion Hazard Data

Flash Point (method used): Noncombustible.
Flammable Limits: Not applicable
LEL: NA **UEL:** NA

Extinguishing Media: Carbon dioxide, dry chemical, water fog

Special Fire Fighting Procedures:

Unusual Fire and Explosion Hazard: Water may be used to cool closed containers, to prevent pressure build up.

Material will not support combustion unless the water has evaporated.

Section V. Reactivity Data

Stability: Stable
Conditions to avoid: None Known
Incompatibility: (Materials to avoid) Strong Oxidizers

Hazardous Decomposition or By-products: NA

Hazardous Polymerization: Will not occur.
Conditions to Avoid: None known

Section VI. Health Hazard Data

Route(s) of Entry	Inhalation?	Skin?	Ingestion?
(see Health Haz.)	Section VIII	See Emergency/First Aid	

Health Hazards: Vapors and mist can irritate nose, throat and lungs. Slight irration to skin .Contact of product to eyes may cause slight iriitation.

Carcinogenicity	NPT?	IARC?	OSHA?
NONE	NE	NE	NE

Signs and symptoms of exposure: Note: Health hazards.

Medical Conditions :
Substantially irritating to eyes. Slightly irritating to Skin.

Emergency and First Aid Proceedures:
If swallowed drink 2 glasses of water. See a Physician. For eye or skin contact, flush eyes with water for 15 minutes. Wash skin with soap and water.

Section VII. Precautions for Safe Handling and Use.
(Steps to be taken if released or spilled): Ventilate area. Remove sources of spill. Remove with inert absorbent. NOTE: This product is not a hazardous waste under RCRA regulations.

Waste Disposal Method: Dispose material as Non-hazardous paint product according to local regulations.

Handling and Storage Precautions: Storage temperatures: Max: 49C/120F. Min: 1C/34F. Keep product from freezing.

Section VIII. Control Measures **Respiratory Protection:** Wear suitable respirator (MSHA/NIOSH-approved or equivalent) where exposure limits are exceeded.
Ventilation: At point of contaminant release.
Protective Gloves: Impervious.
Eye Protection: ANSI Z-87.1 or approved equivelent chemical splash goggles.

Other Protective Clothing or Equipment: Eye wash facility. Safety shower.

Work/Hygienic Practices: Wash thoroughly after handling.

FUHR **International, LLC** Specialty Paint & Wood Coatings High Quality Water based Wood Finishes	**BEST GRADE**	Product Number: 355

Waterborne Acrylic Varnish

Summer 2002

A water based self-sealing, self-cross linking acrylic finish for use on interior wood substrates requiring a high quality sealer and topcoat. This product is designed for the kitchen cabinet industry and exceeds KCMA finish coat testing requirements with proper application. The excellent water, chemical and scratch resistance along with self-sealing technology make this a great finish choice for many applications outside the cabinet industry, including but not limited to furniture, molding, passage doors, millwork and wine racks. 355 offers excellent wetting of the wood providing for the ever desired "solvent look" while remaining non-hazardous and low voc. Typical dry time to touch in ambient conditions is 5 minutes, light handling in 10 minutes and sand able in 20 minutes. Use this product for both the sealer and finish application for best results. Sanding between coats with 320 grit (or higher) sandpaper is recommended for maximum quality and is required after 4 hours ambient dry. Compatible with most finish equipment.

PRODUCT DATA & SPECIFICATIONS

Appearance & Odor:	Amber liquid, mild odor	**VOC content by #:**	.61#/gallon
Evaporation Rate:	Slower than ether	**VOC content by G/l:**	73 Grams / liter
Solubility in Water:	Soluble	**VHAP content:**	0
Specific Gravity:	< 1.01	**VOC % Solids content:**	.003# /solids/gallon
Weight per Gallon:	8.42 #	**Flash Point:**	Non-combustible
Solids by Weight:	2.50 #	**Flammability:**	Not applicable
Solids by Volume:	30 %	**Viscosity:**	# 2 Zahn Cup, 45-50seconds

Substrate Preparation: As a Sealer: surface should be pre-sanded with 220 grit abrasive and cleaned of any dust, dirt, etc. As a Finish: surface should be sealed and sanded with 320 grit or higher abrasive and cleaned of any remaining dust.
Application: Apply in wet coats measured at approximately 3-5 wet mils .
Cleanup: Flush all equipment with water both before and after use of 355. Build-up may be removed with a cleaner solution such as 330 Universal Cleaner & Stripper. Flushing with water is necessary after the use of any cleaning agent to avoid contamination

Featured Benefits

*** Fast Dry * 73 g/l VOC * Excellent Durability * Anti-Sagging Formulation ***
- **High Solids * Water Clean-Up * No Haps * Self-Sealing * Easy Application * Meets KCMA ***
- **May be used as a Class B clear coating for wood applications**

1-800-558-7437

Fuhr International, LLC
64664 Woodburn Drive
Winigan, MO 63566

www.fuhrinternational.com

Available through

Dulux Paint Centers

WOODPRIDE™ Interior Waterborne Aquacrylic Gloss Varnish

1808-0000

Product Description

Our next generation waterborne clear gloss finish. WoodPride Aquacrylic Gloss Varnish provides durable, transparent protection for interior wood surfaces such as cabinets, doors, woodwork, paneling, furniture and floors. This finish is based on an advanced technology acrylic binder which forms a more durable, moisture and chemical resistant film than conventional water based clear finishes. This finish is also fast drying allowing multiple coat applications in a single day. May be used as a waterborne clear alternative to polyurethane finishes. Ideal for use over light woods (ash, maple, etc.), light colored stains or surfaces painted with latex or non-white oil base or alkyd enamels (i.e. faux finishes). Resistant to abrasion, chipping, marring, water, oil, alcohol and blushing.

Features

- Provides durable, transparent protection
- Quick drying and recoat
- Resists abrasion, chipping and marring
- Resists water, oil, alcohol and blushing
- Low odor
- Low VOC

Composition

- Waterborne Acrylic Polyurethane Resin
- Not manufactured with lead or mercury containing materials.

Specifications

Color:
Clear

Finish:
Gloss, 70 units minimum @ 60°

Clean-up Solvent:
Soap and Water

Density:
8.5 lbs/gal (1.02 kg/L)

VOC:
1.59 lbs/gal (191 g/L)

Solids:
Volume - 27% ± 1%
Weight - 31% ± 1%

Practical Coverage:
Apply at 400-500 sq ft/gal (10-12 m^2/L) depending on surface texture and porosity.

Flame Spread Rating:
Class A (0-25) over non-combustible surfaces

Flash Point:
205°F (96°C)

Dry Time 77°F (25°C) & 50% RH:
To touch - 1 hour
To recoat - 3-4 hours

Shelf Life:
1 year minimum - unopened

General Surface Preparation

All surfaces must be uniformly sanded, sound, dry, clean and free of oil, grease, dirt, mildew, wax, flaking paint or varnish and other foreign substances. The final sanding step should be with 150-grit or finer paper (DO NOT USE STEEL WOOL). Dust or vacuum clean.

NEW WOOD: Sand smooth (DO NOT USE STEEL WOOL) and remove all dust. Stain with solventborne stain 1700 if desired. Seal with this product. Finish with one or two coats of this product as needed depending on appearance desired or severity of usage.

WOOD FLOORS: Sand smooth (DO NOT USE STEEL WOOL) and remove all dust. Stain with 1700 if desired. Seal with this product only. Finish with two additional coats of this product. For heavy traffic areas, commercial floor areas or hard usage areas such as stairs use solventborne polyurethane varnish 1902 or 1908.

PREVIOUSLY PAINTED OR VARNISHED SURFACES: Remove all wax, grease and oil by washing with mineral spirits. Sand lightly (DO NOT USE STEEL WOOL). Dust clean. May be applied as a clear finish over aged varnishes, non-flat latex paints or non-white oil base or alkyd enamels. Flat latex paints must be sealed with a latex enamel prior to applying this product. Surfaces in poor condition should be sanded or stripped to bare wood and finished as under **NEW**

solventborne stain WOOD.

Directions For Use

TINTING: Do not tint.

SPREADING RATE: Apply at 400-500 sq ft/gal (10-12 m^2/L) on smooth sealed surfaces. Actual coverage may vary depending on substrate and application method.

APPLICATION: May be applied by synthetic brush, foam applicator, short nap roller or spray. No thinning required. Stir well, but do not shake. Apply thin uniform coats. Do not overbuild. Sand lightly (DO NOT USE STEEL WOOL) and clean thoroughly between coats. For spray application, use low pressure and a .013" tip. Do not apply when surface or air temperature is below 50°F (10°C). Provide good ventilation and warmth for normal drying.

NOTE: Surfaces coated with this product may become slippery when wet. Although incorporation of additives within the product may affect clarity of the dried film, for additional slip resistance in areas of pedestrian traffic add one pound per gallon of coarse pumice or other texturing material.

DRYING TIME: At 77°F (25°C) & 50% R.H., dries to touch in one hour and to recoat in three to four hours. Low temperature, high humidity thick films or poor ventilation will increase these times. The hardening or curing process takes approximately seven days. The floor may be walked on after 24 hours, but the floor is more susceptable to scuffing or marring during this period.

CLEAN-UP: Clean immediately with warm, soapy water.

Precautions

WARNING! CAUSES EYE, SKIN AND RESPIRATORY TRACT IRRITATION. MAY BE HARMFUL IF SWALLOWED. OVEREXPOSURE MAY CAUSE LIVER, KIDNEY, REPRODUCTIVE DAMAGE. USE ONLY WITH ADEQUATE VENTILATION. KEEP OUT OF THE REACH OF CHILDREN. NOTICE: Products in this series contain solvents. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal. For emergency information call (800) 545-2643. If sanding is done, wear a dust mask to avoid breathing of sanding dust. Do not breathe vapors or spray mist. If you experience eye watering, headaches, or dizziness, leave the area. If properly used, a respirator may offer additional protection. Obtain professional advice before using. Close container after each use. **FIRST AID:** In case of skin contact, wash off **quickly** with plenty of soap and water, remove contaminated clothing. For eye contact flush **immediately** with large amounts of water, for at least 15 minutes. **Obtain emergency medical treatment.** If swallowed, obtain medical treatment **immediately.** If inhalation causes physical discomfort, remove to fresh air. If discomfort persists or any breathing difficulty occurs, **get medical help. KEEP FROM FREEZING. Note: These warnings encompass the product series. Prior to use, read and follow product-specific MSDS and label information.**

DS72-1296

Shipping

FREIGHT CLASSIFICATION:
Paint, Freezable

FLASH POINT:

205°F (96°C)

PACKAGING:
1 quart (0.946 L)
1 gallon (3.785 L)

Dulux Paint Centers
From the Makers of Dulux, Sinclair, Glidden & Devoe Coatings

ICI Paints North America 925 Euclid Avenue Cleveland, Ohio 44115 EMERGENCY TELEPHONE NO. (800) 545-2643

ICI Paints

MATERIAL SAFETY DATA SHEET

prepared 10/03/01

HAZARDS IDENTIFICATION (ANSI Section 3)

Primary route(s) of exposure : Inhalation, skin contact, eye contact, ingestion.

Effects of overexposure :

Inhalation : Irritation of respiratory tract. Prolonged inhalation may lead to mucous membrane irritation, dizziness and/or lightheadedness, headache, nausea, central nervous system depression, confusion, blood abnormalities, loss of consciousness.

Skin contact : Irritation of skin. Prolonged or repeated contact can cause dermatitis.

Eye contact : Irritation of eyes. Prolonged or repeated contact can cause tearing of eyes, redness of eyes.

Ingestion : Ingestion may cause mouth and throat irritation, drowsiness, dizziness and/or lightheadedness, headache, uncoordination, nausea, vomiting, diarrhea, gastro-intestinal disturbances, central nervous system depression, intoxication, liver damage, kidney damage, reproductive system damage.

Medical conditions aggravated by exposure : Eye, skin, respiratory disorders

FIRST-AID MEASURES (ANSI Section 4)

Inhalation : Remove to fresh air. Restore and support continued breathing. Get emergency medical attention. Have trained person give oxygen if necessary. Get medical help for any breathing difficulty. Get medical attention if discomfort or irritation persists.

Skin contact : Flush from skin with water. Then wash thoroughly with soap and water. Remove contaminated clothing. Wash contaminated clothing before re-use. If irritation occurs, consult a physician.

Eye contact : Flush immediately with large amounts of water, especially under lids for at least 15 minutes. If irritation or other effects persist, obtain medical treatment.

Ingestion : If swallowed, obtain medical treatment immediately.

FIRE-FIGHTING MEASURES (ANSI Section 5)

Fire extinguishing media : Dry chemical or foam water fog. Carbon dioxide. Vapors are heavier than air and may travel long distances to a source of ignition and flash back. Closed containers may burst if exposed to extreme heat or fire. In closed tanks, water or foam may cause frothing or eruption.

Fire fighting procedures : Water may be used to cool and protect exposed containers. Firefighters should use full protective clothing, eye protection, and self-contained breathing apparatus.

Hazardous decomposition or combustion products : Carbon monoxide, carbon dioxide, oxides of nitrogen, toxic gases.

ACCIDENTAL RELEASE MEASURES (ANSI Section 6)

Steps to be taken in case material is released or spilled : Comply with all applicable health and environmental regulations. Eliminate all sources of ignition. Ventilate area. Spills may be collected with absorbent materials. Evacuate all unnecessary personnel. Place collected material in proper container. Large spills - shut off leak if safe to do so. Dike and contain spill. Pump to storage or salvage vessels. Use absorbent to pick up excess residue. Keep salvageable material and rinse water out of sewers and water courses. Small spills - use absorbent to pick up residue and dispose of properly.

HANDLING AND STORAGE (ANSI Section 7)

Handling and storage : Store below 100f (38c). Keep away from heat, sparks and open flame. Keep from freezing.

Other precautions : Use only with adequate ventilation. Do not take internally. Keep out of reach of children. Avoid contact with skin and eyes, and breathing of vapors. Wash hands thoroughly after handling, especially before eating or smoking. Keep containers tightly closed and upright when not in use. Empty containers may contain hazardous residues. Ground equipment when transferring to prevent accumulation of static charge.

EXPOSURE CONTROLS/PERSONAL PROTECTION (ANSI Section 8)

Respiratory protection : Control environmental concentrations below applicable exposure standards when using this material. When respiratory protection is determined to be necessary, use a NIOSH/MSHA (Canadian z94.4) Approved elastomeric sealing- surface facepiece respirator outfitted with organic vapor cartridges and paint spray (dust/mist) prefilters. Determine the proper level of protection by conducting appropriate air monitoring. Consult 29CFR1910.134 For selection of respirators (Canadian z94.4).

Ventilation : Provide dilution ventilation or local exhaust to prevent build-up of vapors.

Personal protective equipment : Eye wash, safety shower, safety glasses or goggles. Impervious gloves, impervious clothing, face shield, apron, boots.

STABILITY AND REACTIVITY (ANSI Section 10)

Under normal conditions : Stable see section 5 fire fighting measures

Materials to avoid : Oxidizers, acids, reducing agents, bases. Alkalis caustics, mineral acids.

Conditions to avoid : Elevated temperatures, contact with oxidizing agent, storage near acids, freezing, sparks, open flame, extremes in temperature.

Hazardous polymerization : Will not occur

TOXICOLOGICAL INFORMATION (ANSI Section 11)

Supplemental health information : Contains a chemical that may be absorbed through skin. Notice - reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal. Other effects of overexposure may include toxicity to liver, kidney, reproductive system.

Carcinogenicity : No carcinogenic effects are anticipated

Reproductive effects : No reproductive effects are anticipated

Mutagenicity : No mutagenic effects are anticipated

Teratogenicity : Prolonged ingestion of diethylene glycol monomethyl ether has resulted in fetal development abnormalities in rats and effects on fertility in mice.

ECOLOGICAL INFORMATION (ANSI Section 12)

No ecological testing has been done by ICI paints on this product as a whole.

DISPOSAL CONSIDERATIONS (ANSI Section 13)

Waste disposal : Dispose in accordance with all applicable regulations. Avoid discharge to natural waters.

REGULATORY INFORMATION (ANSI Section 15)

As of the date of this MSDS, all of the components in this product are listed (or are otherwise exempt from listing) on the TSCA inventory. This product has been classified in accordance with the hazard criteria of the CPR (controlled products regulations) and the MSDS contains all the information required by the CPR.

Complies with OSHA hazard communication standard 29CFR1910.1200.

Physical Data (ANSI Sections 1, 9, and 14)

Product Code	Description	Wt. / Gal.	VOC gr. / ltr.	% Volatile by Volume	Flash Point	Boiling Range	HMIS	DOT, proper shipping name
1808-0000	woodpride waterbore aquacrylic varnish gloss finish, interior, clear	8.50	192.84	73.33	above 200f	192-477	*110	paint ** protect from freezing **

Ingredients — Product Codes with % by Weight (ANSI Section 2)

Chemical Name	Common Name	CAS. No.	1808-0000
ethanol, 2-(2-methoxyethoxy)-	diethylene glycol monomethyl ether	111-77-3	1-5
propanoic acid, 2-methyl-, monoester with 2,2,4-trimethyl-1,3-pentanediol	texanol	25265-77-4	1-5
water	water	7732-18-5	60-70
2-pyrrolidinone, 1-methyl-	n-methylpyrrolidone	872-50-4	1-5
polyurethane resin	polyurethane resin	Sup. Conf.	5-10
acrylic resin	acrylic resin	Sup. Conf.	20-30

Chemical Hazard Data (ANSI Sections 2, 8, 11, and 15)

		ACGIH-TLV				OSHA-PEL												
Common Name	CAS. No.	8-Hour TWA	STEL	C	S	8-Hour TWA	STEL	C	S	S.R. Std.	S2	S3	CC	H	M	N	I	O
diethylene glycol monomethyl ether	111-77-3	not est.	not est.	not est.	not est.	not est.	not est.	not est.	not est.	not est.	n	y	n	y	n	n	n	n
texanol	25265-77-4	not est.	not est.	not est.	not est.	not est.	not est.	not est.	not est.	not est.	n	n	n	n	n	n	n	n
n-methylpyrrolidone	872-50-4	not est.	not est.	not est.	not est.	not est.	not est.	not est.	not est.	not est.	n	y	n	n	n	n	n	n
polyurethane resin	Sup. Conf.	not est.	not est.	not est.	not est.	not est.	not est.	not est.	not est.	not est.	n	n	n	n	n	n	n	n

Footnotes:
C=Ceiling - Concentration that should not be exceeded, even instantaneously.
S=Skin - Additional exposure, over and above airborn exposure, may result from skin absorption.
n/a=not applicable
not est=not established
CC=CERCLA Chemical
ppm=parts per million
mg/m3=milligrams per cubic meter
Sup Conf=Supplier Confidential
S2=Sara Section 302 EHS
S3=Sara Section 313 Chemical
S.R.Std.=Supplier Recommended Standard
H=Hazardous Air Pollutant, M=Marine Pollutant
P=Pollutant, S=Severe Pollutant
Carcinogenicity Listed By:
N=NTP, I=IARC, O=OSHA, y=yes, n=no

Geocel®

TECHNICAL DATA

9500™ MB
ELASTOMERIC FR COATING FOR METAL BUILDINGS

1. PRODUCT NAME:

9500 MB Elastomeric Coating. An elastomeric coating for protecting metal against corrosive conditions and stopping roof leaks.

2. MANUFACTURER:

GEOCEL CORPORATION
P.O. Box 398
Elkhart, IN 46515
Ph: (800) 348-7615
Fx: (800) 348-7009

3. PRODUCT DESCRIPTION AND USE:

9500 MB is a blend of polymers and EPDM that, when cured forms a rubber membrane coating that protects metal against corrosive conditions. It was specifically designed to protect metal against corrosion and to prevent metal roofs from leaking. 9500 MB cures to a flexible, durable, non-tacky finish. The chemical make-up of 9500 MB allows for movement of a metal building roof without the tearing of this coating. 9500 MB resists weathering, ultraviolet deterioration and dirt pick up and will remain highly reflective for years. 9500MB is designed for use over metal roofing and siding in both commercial and industrial applications.

Physical Properties:

Solids by Weight	62%
Solids by Volume	60%
Weight per Gallon	10.4 lbs.
Viscosity	100 KU
pH	9.0
Flash Point	None to Boiling
Tensile Strength at max stress	400 psi
Elongation at Break	500%
Hardness - Shore A (ASTM-D-2240)	90
Permeability (ASTM E-96-A, D-1653)	2.2 perm
Mildew Growth	None (2 yrs. exterior)
Service Temp Range	- 70° to 200° F

Fire Resistance Testing:

UL-790 Class A Systems*: 9500 MB has UL-790 Class A classified systems over UL classified spray-applied urethane foams. Refer to UL Building Materials Directory or UL Classification Cards for foam manufacturers and types, foam thicknesses and densities, incline and coating requirements to qualify as a rated roof system. Refer to File #R 14098.

UL Roof Deck Construction:** 9500 MB has UL Class A Classification over urethane foam sprayed directly to metal decks. Refer to UL Building Material Directory under Roof Deck Construction #136 for conditions to qualify as a rated roof system.

*Cements and Coatings for built-up Roof Covering are classified by Underwriters Laboratories, Inc. for external fire exposure only. See UL Classified Building Material Index.

**Roof Coatings Classified by Underwriters Laboratories, Inc. for internal fire exposure only for use in Construction No. 136. See UL Classified Building Materials Directory.

Limitations: 9500 MB should not be used on refrigerated tanks or in any other application where a vapor barrier is required.

Packaging: 9500 MB is packaged in 5 gallon pails and 55 gallon drums.

Colors: Standard colors are white and light gray. Special colors may be available upon request. Call Geocel Corporation at (800) 348-7615 for further technical assistance.

4. APPLICATION INSTRUCTIONS:

Recommended Equipment: 9500 MB is supplied in a sprayable consistency. However, it can be applied with brush or roller, if desired. Best results will be obtained with the use of proper airless spray equipment. Larger equipment will increase production capabilities. There is no limit to the maximum size of equipment with which 9500 MB may be sprayed. When finished, use water to thoroughly flush equipment. Purge the water from the system with cellosolve solvent. Leave solvent in the lines and equipment until next use. Close container tightly after each use.

Mixing and Thinning: Although it may appear homogeneous, each drum should be thoroughly mixed with explosion proof power mixing equipment prior to application. In hot weather, opened containers may form a surface skin in the drum. This must be removed before mixing or spraying.

9500 MB has a rich thixotropic consistency. Thinning is not recommended.

Application Notes: The overall coverage should be between 2 to 2.5 gallons per 100 sq. ft.

Based on the above specifications and specific written requests, Geocel Corporation will provide a 5 year no leak warranty for metal roofing.

1 gal/100 sq.ft.	= 16 wet mils	=	9.6 dry mils
1.5 gal/100 sq. ft.	= 24 wet mils	=	14.4 dry mils

White and gray coats may be alternated if desired to assist the applicator to see that the second coat coverage is complete and continuous.

Weather Precautions: 9500 MB may be applied at any temperature over 45° F. At temperatures below 60° F., 9500 MB may become more difficult to spray. Maintaining product temperature at or above this temperature,by the use of drum heaters will facilitate spraying and speed cure times. Do not spray if temperature is expected to drop below 32° F. within 24 hours.

9500 MB will be resistant to rain and dew as soon as it thoroughly tacks off (after approximately 1-1/2 to 2 hrs. of sunlight at 75° F. & 75% R.H.) At cooler temperatures, high humidities, or overcast conditions, the tacking off process will require longer times. Do not apply second coat of 9500 MB until first coat is thoroughly dry. Do not apply at temperatures below 35° F. In cooler weather, drums should be stored in a warm place to facilitate ease of spraying.

NO DRUM MAY BE HEATED WITH DIRECT FLAME OR WITH ANY OTHER SOURCE OF OPEN HEAT. Use with adequate ventilation.Observe all standard safety practices. All explosion proof electrical equipment should be grounded in accordance with the National Electrical Code.

DO NOT ALLOW 9500 MB TO FREEZE.

Disposal: Dispose of container in accordance with local, state and federal regulations. Each person, firm, or corporation engaged in the application, installation, disposal or any other use of these materials shall carefully determine whether there is a potential hazard associated with such product in a specific usage, and utilize all appropriate precautionary and safety measures as outlined in local, state and Federal regulations governing the use or disposal of these products or the construction and/or renovation of structures.

5. LIMITED WARRANTY:

Geocel Corporation warrants this product to be free of manufacturing defects due to workmanship and materials for the duration of five (5) years in accordance with the conditions stated in this product Technical Data sheet.The warranty is limited to the replacement of this product when such product proves to be defective in manufacture. This express warranty will only apply if the product is used for its specified purposes. It does not apply to failures due to improper application.

The company shall not be liable, in any event, for any incidental, consequential, special or indirect damages or damages to a structure or its contents from any cause whatsoever. This warranty may not be modified or amended by an employee, representative, agent or customer of Geocel Corporation. This warranty is exclusive and is in lieu of all other warranties, express or implied, including any implied warranty for merchantability or fitness for a particular purpose.

9500 SHORT FORM SPECIFICATIONS

9500 OVER METAL ROOFING

1) Power wash roof with Trisodium Phosphate and water, rinse and allow to dry.

2) Stitch screw open seams where necessary. If seams do not close, tape with Seaming Tape.

3) Prime with **9912 PRIMER** at the rate of 1 gallon per 400 square feet. If rust exists, prime with **9920 PRIMER** at the rate of one gallon per 300 square feet.

4) Spray all seams and fastener heads with 40 to 50 mils of 9500 MB

5) Spray balance of roof with 1.5 to 2.0 gallons per 100 square feet of **9500 MB**

The information contained herein is, to the best of our knowledge, true and accurate, but no guarantee, written or implied, is given with respect to said information or recommendations. All Geocel Corporation products are manufactured in conformance with our quality assurance standards, but since conditions of use are beyond our control, Geocel disclaims any liability incurred in connection with the use of our products or the information contained herein.Furthermore, nothing contained herein shall be construed as a recommendation to use any product in conflict with existing patents.

Material Safety Data Sheet May be used to comply with OSHA's Hazard Communication Standard 29 CFR 1910.1200. Standard must be consulted for specific requirements.	**U.S. Department of Labor** Occupational Safety and Health Administration (Non-Mandatory Form) Form Approved OMB No. 1218-0072
IDENTITY 9500 MB	*Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.*

Section I

Manufacturer's Name	Emergency Telephone Number
Geocel Corporation	(800) 255-3924
Address (Number, Street, City, State, and ZIP Code)	Telephone Number for Information
P.O. Box 398	(219) 264-0645
	Date Prepared
Elkhart, IN 46514	8-21-00 Supercedes 10/99
	Signature of Preparer (optional)
	Technical Staff

Section II - Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
Mineral Spirits (CAS# 8052-41-3)	100 PPM			2%
Aromatic Hydrocarbon (CAS# 64742-95-6)	100 PPM			1.5%

VOC Content minus water 35.57 g/l

HMIS Rating - Health 1 Flammability 0 Reactivity 0 Personal Protection B

Section III - Physical/Chemical Characteristics

Boiling Point	100 C/212 F (water)	Specific Gravity (H2O = 1)	1.4
Vapor Pressure (mm Hg)	N/A	Melting Point	N/A
Vapor Density (AIR = 1)	less than 1 (water)	Evaporation rate (Butyl Acetate = 1)	less than 1 (water)

Solubility in Water
dilutable

Appearance and Odor
creamy, viscous liquid/mild acrylic odor

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
N/A		N/A	N/A

Extinguishing Media
N/A

Special Firefighting Procedures
N/A

Unusual Fire and Explosion Hazards
N/A

Section V - Reactivity Data

Stability	Unstable		Conditions to Avoid onset of polymer decomposition is 177C/350 F
	Stable	X	

Incompatibility (Materials to Avoid)
none known

Hazardous Decomposition or Byproducts
none known

Hazardous Polymerization	May Occur		Conditions to Avoid N/A
	Will Not Occur	X	

Section VI - Health Hazard Data

Route(s) of Entry:	Inhalation?	Skin?	Ingestion?
	X	X	

Health Hazards (Acute and Chronic)
Acute - mild eye, skin and pulmonary irritant

Chronic - none known

Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated?

Signs and Symptoms of Exposure
headache, nausea, eye and skin irritation

Medical Conditions Generally Aggravated by Exposure: Pre-existing eye, skin and respiratory disorders.

Emergency and First Aid Procedure
Eye contact: Flush with large amounts of water. Get medical attention.
Skin contact: Wash with soap and water. Launder contaminated clothing before reuse.
Inhalation: Move individual to fresh air. Get medical attention.
Ingestion: Seek medical attention.

Section VII - Precautions for Safe Handling and Use

Steps to be Taken in Case Material is Released or Spilled
Absorb spill with inert material and transfer to containers for disposal.

Waste Disposal Method
Assure conformity with applicable governmental regulations.

Precautions to be Taken in Handling and Storage
Avoid storage at extremes of temperature.

Other Precautions
N/A

Section VIII - Control Measures

Respiratory Protection (Specify Type)
Not required with adequate ventilation

Ventilation	Local Exhaust X	Special -
	Mechanical (General) X	Other -

Protective Gloves
Recommended

Other Protective Clothing or Equipment
N/A

Work/Hygenic Practices
Wash hands before eating. No smoking.

Roof Coatings
Division

ROOF MATE

THE ROOF PRESERVATION SYSTEM

Meets Federal Specification RRR-S-2838 & ASTM D6083

Technical Data

PRODUCT DESCRIPTION

ROOF MATE is a water-based, high solids elastomeric coating utilizing the latest advances in acrylic technology. Highest quality 100% acrylic resins are combined with reinforcing laminar pigments, an effective biocide package and non-migrating fire retardants, resulting in superior durability, weatherproofing, ultraviolet resistance, algae/mildew resistance and fire retardancy. **ROOF MATE** is a highly reflective, permanently flexible "breathing" membrane, allowing moisture vapor from the substrate or building interior to escape while remaining impervious to mass water penetration from the exterior. **ROOF MATE** is also available in a high-tensile strength version for roof areas subject to severe maintenance traffic, weather conditions, chemical fallout, etc.

BASIC USES

ROOF MATE was especially developed for extending the life of metal, conventional built-up, modified bitumen, concrete, Hypalon, EPDM, sprayed-in-place or board-stock insulation, or composite shingle roofs. **ROOF MATE** forms a waterproof elastomeric seal, uniformly covering the textured profile of various substrates to form a monolithic membrane, providing protection from normal weathering, aging and ultraviolet exposure.

COLORS

ROOF MATE is stocked in White, Light Gray or Medium Gray. An unlimited selection of custom colors are also available for specific applications. Color chips must be furnished to UNITED for all custom colors. **ROOF MATE QS (Quick Set)** is available for marginal conditions when a faster set time is desired with white or light colored topcoats.

WARRANTY

ROOF MATE warranties are available in five (5), ten (10) or fifteen (15) year periods. The warranties guarantee the installation against leaks caused by normal weathering. Refer to individual warranty documents for additional information.

TYPICAL PROPERTIES

1. **Solids by Weight:**
   60% (±2) [ASTM D2369]
2. **Solids by Volume:**
   54% (±2) [ASTM D5201]
3. **Weight per Gallon:**
   11.8 lbs. (±.2) (1.41 kg/l) [ASTM D1475]
4. **Dry Time for Water Resistance:***
   2½ hours @ 70°F (21°C), 50% R.H.
   White @ 16 wet mils (406 microns)
   *Required time will increase @ higher humidities
5. **Tensile Strength:**
   250 psi (±20) (1.80 MPa) @ 75°F (24°C)
   440 psi (±20) (3.17 MPa) @ 0°F (-18°C)
   [ASTM D412]
6. **Elongation:**
   300% (±30) @ 75°F (24°C)
   340% (±30) @ 0°F (-18°C)
   [ASTM D412]
7. **Hardness:**
   55-65 Shore A [ASTM D2240]
8. **Permeance:**
   3.0 U.S. Perms (1.98 Metric Perm)
   @ 20 mils (508 microns) [ASTM E96]
9. **Ultraviolet Resistance:**
   No deleterious effects after 5,000 hours
   [ASTM D822, ASTM G23]
10. **Weather Resistance:**
    No deleterious effects after 5,000 hours
    [ASTM D822, ASTM G23]
11. **High Temperature Stability:**
    No age hardening up to 250°F (121°C)
    [ASTM D794]
12. **Resistance to Wind Driven Rain:**
    0.3% moisture result
    [Federal Specification TTC-555B]
13. **Bond Strength:**
    Exceeds cohesive strength of coating
    [ASTM C297]
14. **Temperature Limits for Service Conditions (Surface):**
    -30°F to 180°F (-35°C to 82°C)
15. **Code Approvals:**
    UL 790 Class A, Factory Mutual Class I and ICBO

UNITED COATINGS
LONGEVITY BY DESIGN

ADVANTAGES OF ROOF MATE

The Following Advantages Combine To Make **ROOF MATE** The Most Effective, Low-Cost Method Of Extending The Life Of New Or Existing Roof Surfaces.

1. Low Cost Application:

Fewer men can do the work that used to require many, at a fraction of the cost of other roofing systems. No bulky or expensive materials to haul, lift, spread, cut or glue. Simply apply **ROOF MATE** using a brush, roller or spray over the **properly prepared roof substrate.** Water cleanup further simplifies the job, which also conforms to all federal and state air pollution standards and VOC regulations.

2. Fast Application:

Roofs protected with **ROOF MATE** can be prepared and coated significantly faster than applying conventional built-up or single-ply systems.

3. High Solids and Resin Content:

The high volume solids of **ROOF MATE**, along with its high hide and vertical hold characteristics, allows for higher film build in fewer coats. This enables **ROOF MATE** to uniformly cover the uneven profile of textured substrates. The high ratio of 100% elastomeric acrylic polymer to filler pigment provides long-term weathering and ultraviolet resistance.

4. Lightweight:

A **ROOF MATE** roof is lighter than conventional and single-ply systems, putting less stress on the rest of the building. No glue, fasteners or heavy ballasting is required.

5. Permanent Flexibility:

ROOF MATE contains no migratory plasticizers, which may give good initial elasticity but leach out of the coating upon extended exterior exposure. **ROOF MATE** remains permanently flexible through the use of high grade, 100% elastomer acrylic polymers.

6. Colorfast:

The acrylic resins utilized in **ROOF MATE** crosslink under exterior exposure to lock in color and lock out dirt. The topcoat color remains true through years of weathering, while the tight, crosslinked surface repels dirt to remain clean.

7. Low Maintenance Costs:

With a **ROOF MATE** roof there is no asphalt to degrade, metal to corrode or seams to come apart. It is formulated to remain flexible to -30°F without cracking under stress, and is impervious to minor ponding water associated with most roofs. When maintenance is required, the repair is accomplished with the use of an acrylic caulk or touch-up with additional **ROOF MATE.**

8. Resists Abusive Weather:

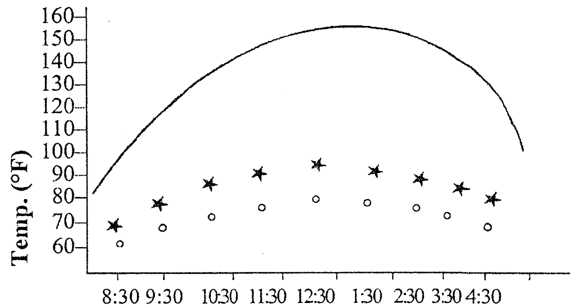
ROOF MATE will take abusive weather conditions of all types. Ice, snow, wind driven rain and sand do not penetrate its tough, dense surface under normal conditions.

9. Long Term Fire Protection:

ROOF MATE utilizes non-migratory fire retardants that become an integral and inseparable part of the coating to provide permanent fire retardancy.

10. Reduced Energy Cost:

ROOF MATE topcoat remains white to reflect the sun's heat, unlike dark-colored roofs that retain heat and are subject to ultraviolet degradation. Roof temperatures can be reduced in excess of 50°F.



——— Black uncoated shingles
★ ★ ★ ★ White **ROOF MATE** coated shingles
∘ ∘ ∘ ∘ ∘ Air temperature

11. Resistance To Foot Traffic:

ROOF MATE'S tough finish, together with its flexibility and bond strength characteristics, allow it to easily withstand the stresses of normal roof maintenance traffic.

12. Code Approvals:

ROOF MATE is UL classified as a Class "A" Fluid Applied Coating System, and as a Class A, B or C Maintenance & Repair System as outlined in the UL Roofing Materials & Systems Directory. It is Factory Mutual Approved for recover over FMRC-rated BUR or insulated metal panels. **ROOF MATE** is also ICBO evaluated and listed.

13. Warranty Programs:

ROOF MATE is backed by 5, 10 and 15 year, non-prorated warranty programs. These guarantee to the building owner that the coating system will not leak as result of degradation from normal weathering. All warranty programs are extendable to last for the life of the structure.

UNITED COATINGS
LONGEVITY BY DESIGN
19011 E. Cataldo Ave. • Greenacres, WA 99016
(509) 926-7143 • Fax: (509) 928-1116
(800) 541-4383 • www.unitedcoatings.com

PRODUCT NAME: ROOFMATE HIGH TENSILE (E-2885)   HMIS CODES: H F R P
PRODUCT CODE: SO 122   2 0 0 I

================== SECTION 1 - MANUFACTURER IDENTIFICATION =================

MANUFACTURER'S NAME: UNITED COATING MANUFACTURING CO
ADDRESS : 19011 EAST CATALDO ROAD
GREENACRES, WASHINGTON 99016-9423
INITIAL(FIRST CALL)CHEMTREC(800)424-9300
EMERGENCY PHONE : BACK-UP(800)541-4383DATE PRINTED : 7/7/03
DATE REVISED : JULY 2000
INFORMATION PHONE : (509) 926-7143

========== SECTION 2 - HAZARDOUS INGREDIENTS/SARA III INFORMATION =========

REPORTABLE COMPONENTS	CAS NUMBER	MM HG	@ TEMP	WEIGHT PERCENT
ACRYLIC POLYMER	MIXTURE	17	68F-20C	56
AQUA AMMONIA CAS#1336-21-6, .1%MAX. OSHA STEL 35PPM AS AMMONIA, ACGIH TWA 25PPM AS AMMONIA, STEL 35PPM AS AMMONIA. NO OTHER EXPOSURE LIMITS HAVE BEEN ESTABLISHED.				
CALCIUM CARBONATE	471-34-1	N/A	N/A	21
OSHA PEL-15MG/M3, TOTAL DUST, 5MG/M3, RESPIRABLE DUST. ACGIH TLV-10 MG/M3, TOTAL DUST CONTAINING NO ASBESTOS AND <1% FREE SILICA. IF SILICA LEVELS ABOVE 1.0% ARE PRESENT, THE TLV VALUE IS 0.1 MG OF RESPIRABLE SILICA PER CU. METER FOR BOTH OSHA PEL AND ACGIH TLV.				
CALCIUM CARBONATE	1317-65-3	N/A	N/A	11
OSHA PEL - 15 MG/M3 TOTAL DUST, 5 MG/M3 RESPIRABLE DUST. ACGIH TLV - 10 MG/M3 TOTAL DUST CONTAINING NO ASBESTOS & <1.0% FREE SILICA. IF SILICA LEVELS ABOVE 1.0% ARE PRESENT, THE TLV VALUE IS 0.1 MG OF RESPIRABLE SILICA PER CU. METER FOR BOTH OSHA PEL AND ACGIH TLV.				
WATER	7732-18-5	UNK	UNK	6
NO OEL'S ESTABLISHED.				
TITANIUM DIOXIDE	13463-67-7	N/A	N/A	4
TITANIUM DIOXIDE, 86-97%, CAS#13463-67-7, ACGIH TLV-10MG/M3, TOTAL DUST TWA, OSHA PEL-15MG/M3, TOTAL DUST, 8 HR TWA, AEL(ACCEPTABLE EXPOSURE LIMIT) OF 10MG/M3, TOTAL DUST 8 HR TWA, 5MG/M3 RESPIRABLE DUST 8 HR TWA. (AEL IS THE EXPOSURE LIMIT RECOMMENDED BY THE MANUFACTURER OF THIS CHEMICAL). ALUMINUM HYDROXIDE, CAS#21645-51-2, 1-5%, NO EXPOSURE LIMITS ESTABLISHED.				

*** No toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372 are present. ***

THIS MSDS MAY BE USED FOR OTHER COLORS AND CONTAINER SIZES OF THIS PRODUCT. WHEN PARTS A AND B ARE COMBINED, THE HAZARD WARNINGS FOR BOTH COMPONENTS ARE PRESENT.

================SECTION 3 HAZARDS IDENTIFICATAION====================

POTENTIAL HEALTH EFFECTS

EYES:

SKIN:

INGESTION:
MAY CAUSE ABDOMINAL PAIN, NAUSEA AND VOMITING.

INHALATION:
VAPOR OR SPRAY MIST CAN CAUSE HEADACHE, NAUSEA AND IRRITATION OF THE NOSE, THROAT AND LUNGS.

==============SECTION 4 FIRST AID MEASURES======================================

EYES:

SKIN:

INGESTION:

INHALATION:

NOTE TO PHYSICIAN:

NONE FOR THIS MATERIAL

============SECTION 5 FIRE FIGHTING MEASURES=====================================

FLAMMABLE PROPERTIES:

FLASH POINT: >205F/>96C SETA FLASH CLOSED CUP.

LOWER FLAMMABLE LIMITS: N/A

UPPER FLAMMABLE LIMIT: N/A

AUTO IGNITION TEMPERATURE: NOT AVAILABLE

EXTINGUISHING MEDIA: FOAM, CO2, DRY CHEMICAL, WATER FOG OR SPRAY, AS APPROPRIATE
FOR SURROUNDING FIRE.

SPECIAL FIRE FIGHTING PROCEDURES:

DO NOT ENTER ANY ENCLOSED OR CONFINED SPACE WITHOUT FULL PROTECTIVE EQUIPMENT, INCLUDING SELF-CONTAINED BREATHING APPARATUS (PRESSURE-DEMAND MSHA/NIOSH APPROVED OR EQUIVALENT)TO PROTECT AGAINST THE HAZARDOUS EFFECTS OF COMBUSTION PRODUCTS AND OXYGEN DEFICIENCY.

===========SECTION 6 ACCIDENTAL RELEASE MEASURES================================

SMALL SPILL:

DIKE AND ABSORB WITH INERT MATERIAL SUCH AS SAND AND REMOVE ALL LIQUID WITH THE USE OF A VACUUM SYSTEM. IF UNABLE TO REMOVE AS A LIQUID, THEN BEGIN TO ABSORB WITH SAND, SAW DUST OR COMMERCIAL ABSORBANT, AND SCOOP UP AND PLACE IN CONTAINERS FOR PROPER DISPOSAL. KEEP SPILLS AND CLEANING RUNOFF OUT OF THE MUNICIPAL SEWERS AND OPEN BODIES OF WATER. DECONTAMINATE ALL CLOTHING AND THE SPILL AREA WITH A DETERGENT AND LARGE AMOUNTS OF WATER.

LARGE SPILL:

USE SAME PROCEDURE AS SMALL SPILL.

===========SECTION 7 HANDLING AND STORAGE=======================================

HANDLING & STORAGE:

KEEP FROM FREEZING. KEEP CONTAINER COOL AND DRY. USE AND STORE THIS PRODUCT WITH ADEQUATE VENTILATION. KEEP PRODUCT CONTAINERS TIGHTLY CLOSED WHEN NOT IN USE. AVOID SUBJECTING THIS PRODUCT TO EXTREME TEMPERATURE VARIATIONS.

OTHER PRECAUTIONS:

CLOSED CONTAINERS MAY EXPLODE DUE TO PRESSURE BUILD-UP IF EXPOSED TO EXTREME HEAT. DO NOT GET IN EYES, ON SKIN OR ON CLOTHING. AVOID PROLONGED OR REPEATED BREATHING OF VAPOR OR SPRAY MIST. KEEP CONTAINER TIGHTLY CLOSED WHEN NOT IN USE. EMPTY CONTAINERS, ESPECIALLY DRUMS, SHOULD BE COMPLETELY DRAINED, PROPERLY BUNGED AND PROMPTLY RETURNED TO A DRUM RECONDITIONER, OR PROPERLY DISPOSED OF. USE ONLY IN A WELL VENTILATED AREA. KEEP OUT OF THE REACH OF CHILDREN.

===========SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION==================

ENGINEERING CONTROLS/PERSONAL PROTECTION:
USE LOCAL EXHAUST VENTILATION WITH A MINIMUM CAPTURE VELOCITY OF 100 FT/MIN. (.05 M.SEC.) AT THE POINT OF VAPOR EVOLUTION. REFER TO THE CURRENT EDITION OF INDUSTRIAL VENTILATION: A MANUAL OF RECOMMENDED PRACTICE PUBLISHED BY THE AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS FOR INFORMATION ON THE DESIGN, INSTALLATION, USE, AND MAINTENANCE OF EXHAUST SYSTEMS.

RESPIRATORY PROTECTION:
WEAR A NIOSH APPROVED RESPIRATOR APPROPRIATE FOR THE VAPOR OR MIST CONCENTRATION AT THE POINT OF USE. APPROPRIATE RESPIRATORS MAY BE A FULL FACEPIECE OR A HALF MASK AIR-PURIFYING CARTRIDGE RESPIRATOR EQUIPPED FOR ORGANIC VAPORS/MISTS, A SELF-CONTAINED BREATHING APPARATUS IN THE PRESSURE DEMAND MODE, OR A SUPPLIED-AIR RESPIRATOR. REFER TO OSHA STANDARD 29 CFR 1910.134 FOR ADDITIONAL INFORMATION.

SKIN PROTECTION:
THE USE OF GLOVES IMPERMEABLE TO THE SPECIFIC MATERIAL HANDLED IS ADVISED TO PREVENT SKIN CONTACT AND POSSIBLE IRRITATION. NOTE THAT PVA DEGRADES IN WATER.

EYE PROTECTION:
CHEMICAL GOGGLES. IF SPLASHING MAY OCCUR OR DURING SPRAY OPERATIONS WEAR A FACE SHIELD, UNLESS A FULL FACE PIECE RESPIRATOR IS USED. DO NOT WEAR CONTACT LENSES AS THEY MAY CONTRIBUTE TO THE SEVERITY OF INJURY TO THE EYE FROM CONTACT WITH LIQUID AND SPRAY MIST.

=============== SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES====================

BOILING RANGE: 212F/100C - 2500-3000C   **SPECIFIC GRAVITY (H2O=1): 1.3359**
VAPOR DENSITY: LIGHTER THAN AIR   **EVAPORATION RATE:**
COATING V.O.C.: 0.13 lb/gl   COATING V.O.C.: 16 g/l

MATERIAL V.O.C.: 0.08 lb/gl   **MATERIAL V.O.C.: 9 g/l**
SOLUBILITY IN WATER: SOLUBLE.
APPEARANCE: HIGHLY THIXOTROPIC LIQUID.
ODOR: FAINT AMMONIACAL ODOR.

====================== SECTION 10 STABILITY & REACTIVITY DATA===============

STABILITY:
STABLE
CONDITIONS TO AVOID

INCOMPATIBILITY (MATERIALS TO AVOID)
AVOID STRONG OXIDIZING AGENTS SUCH AS LIQUID CHLORINE, CONCENTRATED OXYGEN, SODIUM HYPOCHLORITE OR CALCIUM HYPOCHLORITE.

HAZARDOUS DECOMPOSITION OR BY PRODUCTS:
THERMAL DECOMPOSITION MAY YIELD ACRYLIC MONOMER, CARBON MONOXIDE AND CARBON DIOXIDE. UNIDENTIFIED ORGANIC COMPOUNDS IN FUMES AND SMOKE MAY BE FORMED DURING COMBUSTION.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

=================== SECTION 11 TOXICOLOGICAL INFORMATION=====================

EYE:
INCONSEQUENTIAL IRRITATION
SKIN:
SKIN IRRITATION- RABBIT: PRACTICALLY NON-IRRITATING. DERMAL LD50-RABBIT: >5000 mg/kg.

INGESTION:
INFORMATION IS BASED ON THE TOXICITY PROFILES FOR A NUMBER OF ACRYLIC EMULSIONS THAT ARE COMPOSITIONALLY SIMILAR TO THIS PRODUCT
TYPICAL DATA ARE:
PRACTICALLY NON-IRRITATING

INHALATION:
NO DATA
SUBCHRONIC:
HEADACHE, NAUSEA, ABDOMINAL PAIN AND IRRITATION OF THE NOSE,THROAT AND LUNGS.
SKIN AND EYE IRRITATION.

CHRONIC/CARCINOGENICITY:
NO DATA
TERATOLOGY:
NO DATA
REPRODUCTION:
NO DATA.
MUTAGENICITY:
NO DATA.

==================SECTION 12 ECOLOGICAL INFORMATION=========================
ECOTOXICOLOGICAL INFORMATION:
INHERENT BIODEGRADABILITY (OECD 302 B): THIS TYPE OF PRODUCT IS NOT BIODEGRADABLE BUT READILY BIOELIMINABLE.
EMULSION POLYMER BIODEGRADATION IS GENERALLY CONSIDERED LIMITED AND DEPENDENT ON POLYMER SIZE AND ORIGIN OF TREATMENT SLUDGE. HOWEVER, MOST OF THESE POLYMERS READILY ABSORB ONTO WATER TREATMENT SLUDGE AND THEREFORE WOULD BE BIOELIMINABLE FROM EFFLUENTS.

ACTIVATED SLUDGE RESPIRATORY INHIBITION (OECD 209): >100MG/L (NON-INHIBITING)

THE INFORMATION SHOWN IS BASED ON PROFILES OF COMPOSITIONALLY SIMILAR MATERIALS.

ALGAE (SELENASTRUM CAPRICORNUTUM), 72 HOUR EC50: >100 PPM (NON-TOXIC) RAINBOW TROUT (ONCORHYNCHUS MYKISS), 96 HOUR LC50: >100 PPM (NON-TOXIC) DAPHNIA MAGNA, 48 HOUR EC50: >100 PPM (NON-TOXIC) MICROTOX, 15 MINUTE EC50: >300 PPM (NON-TOXIC).

THE ABOVE DATA ARE FOR A COMPOSITIONALLY SIMILAR MATERIAL.

CHEMICAL FATE INFORMATION:
NO DATA.

SECTION 13 DISPOSAL CONSIDERATIONS:===

INSTRUCTIONS:
DISPOSE OF UNUSED PRODUCT OR CONTAMINATED PRODUCT AND MATERIALS USED IN CLEANING UP SPILLS OR LEAKS IN A MANNER APPROVED FOR THIS MATERIAL. CONSULT APPROPRIATE FEDERAL, STATE AND LOCAL REGULATORY AGENCIES TO ASCERTAIN PROPER DISPOSAL PROCEDURES. INCINERATION IS ACCEPTABLE AND THE PREFERRED METHOD OF DISPOSAL, HOWEVER; NITROGEN OXIDE EMISSIONS CONTROLS MAY BE REQUIRED TO MEET SPECIFICATIONS. CHEMICAL AND BIOLOGICAL DEGRADATION IS POSSIBLE. EMPTY CONTAINERS WILL RETAIN PRODUCT RESIDUE AND VAPORS AND ARE SUBJECT TO PROPER WASTE DISPOSAL, AS ABOVE.

================SECTION 14 TRANSPORT INFORMATION============================

SHIPPING INFORMATION:
DOT INFORMATION - 49 CFR 172.101
DOT DESCRIPTION: NOT REGULATED

================SECTION 15 REGULATORY INFORMATION===========================

(NOT MEANT TO BE ALL INCLUSIVE-SELECTED REGULATIONS REPRESENTED)
US REGULATIONS:
STATUS OF SUBSTANCES LISTS:
THE CONCENTRATIONS SHOWN IN SECTION II ARE MAXIMUM CEILING LEVELS (WEIGHT %) TO BE USED FOR CALCULATIONS FOR REGULATIONS.
FEDERAL EPA: COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION & LIABILITY ACT OF 1980 (CERCLA) REQUIRES NOTIFICATION OF THE NATIONAL RESPONSE CENTER OF RELEASE OF QUANTITIES OF HAZARDOUS SUBSTANCES EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITIES (RQ'S) IN 40 CFR 302.4.
COMPONENTS PRESENT THAT COULD REQUIRE REPORTING UNDER THE STATUTE ARE:

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986(SARA) TITLE III REQUIRES EMERGENCY PLANNING BASED ON THE THRESHOLD QUANTITIES (TPQ'S) AND RELEASE REPORTING BASED ON REPORTABLE QUANTITIES (RQ'S) IN 40 CFR 355 (USED FOR SARA 302, 304, 311, AND 312)
COMPONENTS PRESENT THAT COULD REQUIRE REPORTING UNDER THE STATUTE ARE:

REQUIRES SUBMISSION OF ANNUAL REPORTS OF RELEASE OF TOXIC CHEMICALS THAT APPEAR IN 40 CFR 372(FOR SARA 313). THIS INFORMATION MUST BE INCLUDED IN ALL MSDS'S THAT ARE COPIED AND DISTRIBUTED FOR THIS MATERIAL.
COMPONENTS THAT COULD REQUIRE REPORTING UNDER THE STATUTE: SEE SECTION II
THE COMPONENTS OF THIS PRODUCT ARE LISTED OR EXCLUDED FROM LISTING ON THE

US TOXIC SUBSTANCE CONTROL ACT (TSCA) CHEMICAL SUBSTANCE INVENTORY.
THE REMAINING PERCENTAGE OF UNSPECIFIED INGREDIENTS, IF ANY, ARE NOT CONTAINED IN ABOVE DE MINIMIS CONCENTRATIONS AND/OR ARE BELIEVED TO BE NON-HAZARDOUS UNDER THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200), AND MAY CONSIST OF PIGMENTS, FILLERS, DEFOAMERS, WETTING AGENTS, RESINS, DRYERS, ANTI-BACTERIAL AGENTS, WATER AND/OR SOLVENTS IN VARYING CONCENTRATIONS.
INTERNATIONAL REGULATIONS:

CANADIAN WHMIS:
DOES NOT CLASSIFY AS HAZARDOUS.
CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA):
NONE KNOWN
EINECS:
NO INFORMATION.
STATE REGULATIONS:
CALIFORNIA PROPOSITION 65: THE FOLLOWING STATEMENT IS MADE IN ORDER TO COMPLY
THE CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986. THIS PRODUCT CONTAINS THE FOLLOWING SUBSTANCE(S) KNOWN TO THE STATE OF CALIFORNIA
A: CAUSE CANCER:

B: CAUSE REPRODUCTIVE HARM:

PENNYSYLVANIA:

NEW JERSEY:

OTHER:

=================SECTION 16 OTHER INFORMATION===========================

THE INFORMATION CONTAINED HEREIN IS FURNISHED WITHOUT WARRANTY OF ANY KIND. USERS SHOULD CONSIDER THESE DATA ONLY AS A SUPPLEMENT TO OTHER INFORMATION GATHERED BY THEM & DETERMINE THE SUITABILITY & COMPLETENESS OF INFORMATION FROM ALL SOURCES TO ASSURE PROPER USE & DISPOSAL OF THESE MATERIALS & THE SAFETY & HEALTH OF EMPLOYEES & CUSTOMERS.

ROOF MATE
BASECOAT
HIGH SOLIDS 100% ACRYLIC ELASTOMER

Technical Data & Application Instructions

PRODUCT DESCRIPTION

ROOF MATE BASECOAT is a 60% volume solids, water-based acrylic elastomer coating utilizing the latest advances in acrylic technology. It combines 100% acrylic emulsion polymers with reinforcing laminar pigments, powerful biocides and non-migrating fire retardants for superior physical properties, adhesion, durability, weatherproofing, mildew resistance and fire retardancy. The fire retardant chemicals are permanently locked into the cured coating and will not leach out upon extended weathering. **ROOF MATE BASECOAT** is a "breathing" coating, allowing moisture vapor to pass through the film while remaining impervious to mass water penetration.

BASIC USES

ROOF MATE BASECOAT was especially developed for use in embedding reinforcement fabric at detail areas and/or over the entire roof. It is also used for achieving film build prior to topcoating with **ROOF MATE Finish Coat**. It is formulated to achieve superior adhesion over metal, conventional built-up, modified bitumen, single ply, concrete and concrete tile, board-stock and sprayed-in-place polyurethane foam, and composite shingle roof substrates. **ROOF MATE BASECOAT** forms a waterproof elastomeric seal, uniformly covering the textured profile of these substrates.

COLORS

ROOF MATE BASECOAT is available in standard medium gray color, which provides for a high visual contrast with the application of the subsequent **ROOF MATE Finish Coat**. The finish coat is available in White, Light Gray, Medium Gray and an unlimited selection of custom colors to meet specific project requirements. Color chips or samples must be furnished to UNITED for all custom colors.

PACKAGING

ROOF MATE BASECOAT is a single-component material available in 5-gallon (19 liter) pails and 55-gallon (209 liter) drums.

MIXING

Use a power mixer capable of uniformly mixing the entire container prior to use. **ROOF MATE BASECOAT** is easily pumped and sprayed at material temperatures of 60°F (16°C) or greater. **Reducing the mixture is not recommended**, as it affects the coatings ability to achieve a heavy film build with excellent vertical hold and hide.

SURFACE PREPARATION

All surfaces must be clean and dry, and free of any dirt, dust, oil, surface chemicals or other contaminants that may interfere with optimum adhesion. All loose gravel, if present, shall be removed by power sweeping and/or vacuuming. Remaining gravel shall be power spud to achieve the smoothest surface possible. Any unsound areas in the roof, i.e. blisters, delamination, deterioration, moisture saturation, severe corrosion, sharp projections, ridges, etc. shall be repaired or replaced. New asphalt shall be exposed to ambient conditions for 45 to 60 days before coating.

Deteriorated or badly corroded metal shall be replaced. Rusted areas shall be mechanically abraded to remove all loose rust and then primed with UNITED'S **Acrylex 300** or **Alumiseal**. New metal roofs exhibiting any type of surface film shall be washed with a vinegar or muriatic acid solution or equivalent to totally remove this film.

Low areas that hold excessive ponding water must be brought into conformance by installing additional drains or adding additional slope to existing drains.

Surfaces that are contaminated with oil, grease, embedded dirt, loose paint or coating, etc. shall be cleaned using **United Cleaning Concentrate (UCC)**. High-pressure power washing may be necessary to remove tightly adhering contaminants. Power-rinse thoroughly with clean water to remove all traces of the **UCC** cleaner. If roof does not require chemical cleaning, thoroughly sweep, vacuum or blow down roof to remove any dirt, dust or other loose contaminants. Refer to separate **Roof Mate Master Guide Specifications** for complete surface preparation procedures on the specific substrate being coated.

UNITED COATINGS
LONGEVITY BY DESIGN

APPLICATION

Reinforce all "moving" cracks, seams, splits, control joints, vertical/horizontal interfaces, roof termination points, openings, transition areas, around the base of all vents pipes and other protrusions, as well as around HVAC units and other roof mounted equipment with **ROOF MATE Mesh**, a polyester reinforcement fabric, embedded into **ROOF MATE BASECOAT**.

Pre-measure the area to be reinforced and cut a strip of 4", 6" or 12" (10, 15 or 20 cm) **ROOF MATE Mesh** (depending upon the detail) to the desired length. Apply **ROOF MATE BASECOAT** liberally over the area to be detailed, at a minimum rate of 1.5 gallons per 100 sq. ft. (.6 l/m²), and embed the mesh so that it is centered over the detail area. Using a brush or roller, work the **ROOF MATE Mesh** into the **ROOF MATE BASECOAT** to eliminate air pockets, wrinkles and gaps. Apply additional **ROOF MATE BASECOAT** as necessary, at a minimum of 1 gallon per 100 sq. ft. (.4 l/m²), to ensure that the **ROOF MATE Mesh** is thoroughly saturated, encapsulated and fully adhered to the substrate.

When incorporating **ROOF MATE Fabric** for reinforcement of the entire roof, apply **ROOF MATE BASECOAT** at the rate of 1.5 gallons per 100 sq. ft. (.6 l/m²) to a 4' (1.2 m) wide section of roof where the fabric reinforcement will begin. Embed and encapsulate the end of the reinforcement fabric roll so that it is anchored at that point.

Roll or spray-apply **ROOF MATE BASECOAT** to a section of roof 4 to 10 feet (1.2 to 3 meters) beyond the fabric at the rate of approximately 1.5 gallons per 100 sq. ft. (.6 l/m²). Roll the reinforcement fabric over the wet **ROOF MATE BASECOAT**, allowing the fabric to conform to the surface contours. To ensure complete encapsulation of the fabric, it must be rolled into the **ROOF MATE BASECOAT** while it is still wet. Do not allow the **ROOF MATE BASECOAT** to surface skin prior to rolling out the fabric.

Work the **ROOF MATE BASECOAT** evenly throughout the **ROOF MATE Fabric** so that it is totally saturated, eliminating any air pockets, wrinkles or gaps. Apply an additional coat of **ROOF MATE Gray** over the top of the saturated **ROOF MATE Fabric** at the rate of approximately 1 gallon per 100 sq. ft. (.4 l/m²) so that it is totally encapsulated. Take extra care to ensure that edges of the fabric are well saturated and adhered. Overlap consecutive passes of **ROOF MATE Fabric** a minimum of 2" (5 cm) on each side.

Substrate porosity and texture will determine the amount of **ROOF MATE BASECOAT** required to encapsulate the reinforcing fabric. Allow the **ROOF MATE BASECOAT** to dry thoroughly prior to applying **ROOF MATE Finish Coat** to the roof.

APPLICATION (Continued)

When using **ROOF MATE BASECOAT** to achieve film build prior to application of the **ROOF MATE Finish**, apply at the rate of 1 to 1½ gallons per 100 sq. ft. (.4 to .6 l/m²) per coat to achieve the desired film thickness.

ROOF MATE BASECOAT may be applied by airless spray equipment or roller. Brush or roller may be used for touch-up and edging work, or for small areas that are not practical for spray application. Airless spray is best suited for field application.

ROOF MATE BASECOAT can be used to obtain up to ½ of the total dry film thickness requirement specified. However, under no circumstances should the subsequent **ROOF MATE Finish** be less than 12 dry mils in thickness at any location.

LIMITATIONS & PRECAUTIONS

ROOF MATE BASECOAT should generally not be used over cold storage tanks or buildings where a vapor barrier is required. **ROOF MATE BASECOAT** will freeze and become unusable at temperatures below 32°F (0°C), or when there is a possibility of temperatures falling below 32°F (0°C) within a 24-hour period after application.

ROOF MATE BASECOAT requires complete evaporation of water to cure. Cool temperatures and high humidity retard cure. **Do not apply if weather conditions will not permit complete cure before rain, dew, fog or freezing temperatures occur**. Do not apply in the late afternoon if heavy moisture condensation may appear during the night.

ROOF MATE BASECOAT may be applied to a wide range of clean, dry and structurally sound substrates. Slope for positive drainage is recommended for any roofing application. It is the responsibility of the applicator to ensure that the roof is sound and sloped properly, and that the expansion joints, vents and flashings have been installed as specified or required.

Avoid breathing of vapor or spray mist. For exterior applications, approved (MSHA/NIOSH) chemical cartridge respirator must be worn by applicator and personnel in vicinity of application. Check filters frequently to ensure proper protection. If used indoors, provide mechanical exhaust ventilation. During indoor spray operations, air line masks or positive pressure hose masks must be worn. Avoid contact with eyes and contact with skin.

For specific information on safety requirements. Refer to OSHA guidelines and **ROOF MATE BASECOAT** Material Safety Data Sheet.

UNITED COATINGS
LONGEVITY BY DESIGN
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(509) 926-7143 • Fax: (509) 928-1116
(800) 541-4383 • www.unitedcoatings.com

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: ROOF MATE BASECOAT 5'S HMIS CODES: H F R P
PRODUCT CODE: RM-BC-05 **2 0 0 I**

================== SECTION 1 - MANUFACTURER IDENTIFICATION =================

MANUFACTURER'S NAME: UNITED COATING MANUFACTURING CO
ADDRESS : 19011 EAST CATALDO ROAD
GREENACRES, WASHINGTON 99016-9423
INITIAL(FIRST CALL)CHEMTREC(800)424-9300
EMERGENCY PHONE : BACK-UP(800)541-4383 **DATE PRINTED** : 7/3/03
DATE REVISED : SEPTEMBER 2002
INFORMATION PHONE : (509) 926-7143

========== SECTION 2 - HAZARDOUS INGREDIENTS/SARA III INFORMATION =========

REPORTABLE COMPONENTS	CAS NUMBER	MM HG	@ TEMP	WEIGHT PERCENT
CALCIUM CARBONATE	471-34-1	N/A	N/A	45
OSHA PEL-15MG/M3, TOTAL DUST, 5MG/M3, RESPIRABLE DUST. ACGIH TLV-10 MG/M3, TOTAL DUST CONTAINING NO ASBESTOS AND <1% FREE SILICA. IF SILICA LEVELS ABOVE 1.0% ARE PRESENT, THE TLV VALUE IS 0.1 MG OF RESPIRABLE SILICA PER CU. METER FOR BOTH OSHA PEL AND ACGIH TLV.				
ACRYLIC POLYMER	MIXTURE	17	68	30
AQUA AMMONIA, CAS#1336-21-6, .2%MAX, MANUFACTURER TWA 25PPM, STEL 35PPM AS AMMONIA. OSHA STEL 35PPM, ACGIH TWA 25PPM STEL 35PPM AS AMMONIA. NO OTHER NO OTHER EXPOSURE LIMITS HAVE BEEN ESTABLISHED.				
WATER	7732-18-5	UNK	UNK	18
NO OEL'S ESTABLISHED.				
DI(HEPTYL, NONYL, UNDECYL) PHTHALATE	68515-42-4	.300	356F180C	2
OSHA PEL: NOT EST., ACGIH TLV: NOT EST., STEL: NOT EST.				
TITANIUM DIOXIDE	13463-67-7	N/A	N/A	2
TITANIUM DIOXIDE, 86-97%, CAS#13463-67-7, ACGIH TLV-10MG/M3, TOTAL DUST TWA, OSHA PEL-15MG/M3, TOTAL DUST, 8 HR TWA, AEL(ACCEPTABLE EXPOSURE LIMIT) OF 10MG/M3, TOTAL DUST 8 HR TWA, 5MG/M3 RESPIRABLE DUST 8 HR TWA. (AEL IS THE EXPOSURE LIMIT RECOMMENDED BY THE MANUFACTURER OF THIS CHEMICAL). ALUMINUM HYDROXIDE, CAS#21645-51-2, 1-5%, NO EXPOSURE LIMITS ESTABLISHED.				

*** No toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372 are present. ***

THIS MSDS MAY BE USED FOR OTHER COLORS AND CONTAINER SIZES OF THIS PRODUCT.

================SECTION 3 HAZARDS IDENTIFICATAION====================

POTENTIAL HEALTH EFFECTS

EYES:
CONTACT WITH VAPOR AND/OR SPRAY MIST MAY RESULT IN IRRITATION, CONTACT WITH LIQUID MAY RESULT IN SEVERE IRRITATION

SKIN:
SUBSTANCE MAY CAUSE SLIGHT SKIN IRRITATION

INGESTION:
MAY CAUSE ABDOMINAL PAIN, NAUSEA AND VOMITING.

INHALATION:
VAPOR OR SPRAY MIST CAN CAUSE HEADACHE, NAUSEA AND IRRITATION OF THE NOSE, THROAT AND LUNGS.

==============SECTION 4 FIRST AID MEASURES====================================

EYES:

IMMEDIATELY FLUSH WITH LOTS OF WATER FOR AT LEAST 15 MINUTES. IF REDNESS, ITCHING, OR A BURNING SENSATION DEVELOPS SEE A PHYSICIAN.

SKIN:
IMMEDIATELY WASH SKIN WITH LOTS OF SOAP AND WATER. REMOVE CONTAMINATED CLOTHING AND SHOES AND WASH BEFORE REUSE. GET MEDICAL ATTENTION IF IRRITATION PERSISTS.

INGESTION:
DO NOT INDUCE VOMITING. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. CONSULT A PHYSICIAN IMMEDIATELY

INHALATION:
REMOVE FROM SOURCE OF EXPOSURE AND INTO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. GET IMMEDIATE MEDICAL ATTENTION.

NOTE TO PHYSICIAN:

NONE FOR THIS MATERIAL

============SECTION 5 FIRE FIGHTING MEASURES=======================================

FLAMMABLE PROPERTIES:
FLASH POINT: >205F/>96C SETA FLASH CLOSED CUP.
LOWER FLAMMABLE LIMITS: N/A
UPPER FLAMMABLE LIMIT: N/A
AUTO IGNITION TEMPERATURE: NOT AVAILABLE
EXTINGUISHING MEDIA: FOAM, CO2, DRY CHEMICAL, WATER FOG OR SPRAY, AS APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE FIGHTING PROCEDURES:
DO NOT ENTER ANY ENCLOSED OR CONFINED SPACE WITHOUT FULL PROTECTIVE EQUIPMENT, INCLUDING SELF-CONTAINED BREATHING APPARATUS (PRESSURE-DEMAND MSHA/NIOSH APPROVED OR EQUIVALENT)TO PROTECT AGAINST THE HAZARDOUS EFFECTS OF COMBUSTION PRODUCTS AND OXYGEN DEFICIENCY.

===========SECTION 6 ACCIDENTAL RELEASE MEASURES================================

SMALL SPILL:
DIKE AND ABSORB WITH INERT MATERIAL SUCH AS SAND AND REMOVE ALL LIQUID WITH THE USE OF A VACUUM SYSTEM. IF UNABLE TO REMOVE AS A LIQUID, THEN BEGIN TO ABSORB WITH SAND, SAW DUST OR COMMERCIAL ABSORBANT, AND SCOOP UP AND PLACE IN CONTAINERS FOR PROPER DISPOSAL. KEEP SPILLS AND CLEANING RUNOFF OUT OF THE MUNICIPAL SEWERS AND OPEN BODIES OF WATER. DECONTAMINATE ALL CLOTHING AND THE SPILL AREA WITH A DETERGENT AND LARGE AMOUNTS OF WATER.

LARGE SPILL:
USE SAME PROCEDURE AS SMALL SPILL.

===========SECTION 7 HANDLING AND STORAGE=======================================

HANDLING & STORAGE:
KEEP FROM FREEZING. KEEP CONTAINER COOL AND DRY. USE AND STORE THIS PRODUCT WITH ADEQUATE VENTILATION. KEEP PRODUCT CONTAINERS TIGHTLY CLOSED WHEN NOT IN USE. AVOID SUBJECTING THIS PRODUCT TO EXTREME TEMPERATURE VARIATIONS.

OTHER PRECAUTIONS:
CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED. SINCE EMPTIED CONTAINERS RETAIN PRODUCT RESIDUES (VAPOR, LIQUID, AND/OR SOLID), ALL HAZARD PRECAUTIONS GIVEN IN THE DATA SHEET MUST BE OBSERVED.

===========SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION===================

ENGINEERING CONTROLS/PERSONAL PROTECTION:

IF CURRENT VENTILATION PRACTICES ARE NOT ADEQUATE DURING MIXING AND APPLICATION OPERATIONS TO MINIMIZE EXPOSURE, SPRAY OR ROLL WITH WIND OR FAN CARRYING VAPORS AWAY FROM YOU. TURN OFF HEATING AND/OR AIR CONDITIONING EQUIPMENT TO PREVENT CONTAMINATING BUILDING.

RESPIRATORY PROTECTION:

FOLLOW OSHA REGULATION 29 CFR 1910.134 FOR RESPIRATOR USE. WHERE OVERSPRAY IS PRESENT, OR IF CONCENTRATION OF PRODUCT IS NOT KNOWN OR ARE ABOVE THE EXPOSURE GUIDELINES. WHEN COMFORT LEVELS MAY BE EXCEEDED, USE AN APPROVED AIR-PURIFYING RESPIRATOR EQUIPPED WITH AN AMMONIA/METHYLAMINE CARTRIDGE(S).

SKIN PROTECTION:

THE USE OF GLOVES IMPERMEABLE TO THE SPECIFIC MATERIAL HANDLED IS ADVISED TO PREVENT SKIN CONTACT AND POSSIBLE IRRITATION. NOTE THAT PVA DEGRADES IN WATER.

EYE PROTECTION:

CHEMICAL GOGGLES. IF SPLASHING MAY OCCUR OR DURING SPRAY OPERATIONS WEAR A FACE SHIELD, UNLESS A FULL FACE PIECE RESPIRATOR IS USED. DO NOT WEAR CONTACT LENSES AS THEY MAY CONTRIBUTE TO THE SEVERITY OF INJURY TO THE EYE FROM CONTACT WITH LIQUID AND SPRAY MIST.

=============== SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES===================

BOILING RANGE: 212F/100C - 2500-3000C	**SPECIFIC GRAVITY (H2O=1): 1.4595**
VAPOR DENSITY: LIGHTER THAN AIR	**EVAPORATION RATE:**
COATING V.O.C.: 0.09 lb/gl	COATING V.O.C.: 10 g/l
MATERIAL V.O.C.: 0.04 lb/gl	**MATERIAL V.O.C.: 5 g/l**

SOLUBILITY IN WATER: SOLUBLE.
APPEARANCE: HIGHLY THIXOTROPIC LIQUID.
ODOR: PUNGENT AMMONIA ODOR.

====================== SECTION 10 STABILITY & REACTIVITY DATA===============

STABILITY:

STABLE

CONDITIONS TO AVOID

INCOMPATIBILITY (MATERIALS TO AVOID)

AVOID STRONG OXIDIZING AGENTS SUCH AS LIQUID CHLORINE, CONCENTRATED OXYGEN, SODIUM HYPOCHLORITE OR CALCIUM HYPOCHLORITE.

HAZARDOUS DECOMPOSITION OR BY PRODUCTS:

THERMAL DECOMPOSITION MAY YIELD ACRYLIC MONOMER, CARBON MONOXIDE AND CARBON DIOXIDE. UNIDENTIFIED ORGANIC COMPOUNDS IN FUMES AND SMOKE MAY BE FORMED DURING COMBUSTION.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

=================== SECTION 11 TOXICOLOGICAL INFORMATION=====================

EYE:

INCONSEQUENTIAL IRRITATION

SKIN:

SKIN IRRITATION- RABBIT: PRACTICALLY NON-IRRITATING. DERMAL LD50-RABBIT: >5000 mg/kg.

INGESTION:
INFORMATION IS BASED ON THE TOXICITY PROFILES FOR A NUMBER OF ACRYLIC EMULSIONS THAT ARE COMPOSITIONALLY SIMILAR TO THIS PRODUCT
TYPICAL DATA ARE:
PRACTICALLY NON-IRRITATING

INHALATION:
IT IS POSSIBLE TO BREATHE THIS MATERIAL UNDER CERTAIN CONDITIONS OF HANDLING AND USE (FOR EXAMPLE, DURING MIXING). BREATHING SMALL AMOUNTS OF THIS MATERIAL DURING NORMAL HANDLING IS NOT LIKELY TO CAUSE HARMFUL EFFECTS. BREATHING LARGE AMOUNTS MAY BE HARMFUL. SYMPTOMS USUALLY OCCUR AT AIR CONCENTRATIONS HIGHER THEN THE RECOMMENDED EXPOSURE LIMITS.

SUBCHRONIC:
HEADACHE, NAUSEA, ABDOMINAL PAIN AND IRRITATION OF THE NOSE,THROAT AND LUNGS.
SKIN AND EYE IRRITATION.

CHRONIC/CARCINOGENICITY:

TERATOLOGY:
NO DATA
REPRODUCTION:
NO DATA.
MUTAGENICITY:
NO DATA.

==================SECTION 12 ECOLOGICAL INFORMATION========================
ECOTOXICOLOGICAL INFORMATION:
NO DATA AVAILABLE
CHEMICAL FATE INFORMATION:
NO DATA.

SECTION 13 DISPOSAL CONSIDERATIONS:==

INSTRUCTIONS:
COAGULATE THE EMULSION BY THE STEPWISE ADDITION OF FERRIC CHLORIDE AND LIME. REMOVE THE CLEAR SUPERNATANT AND FLUSH TO A CHEMICAL SEWER. INCINERATE LIQUID AND CONTAMINATED SOLIDS IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.

================SECTION 14 TRANSPORT INFORMATION============================
SHIPPING INFORMATION:
DOT INFORMATION - 49 CFR 172.101
DOT DESCRIPTION: NOT REGULATED

================SECTION 15 REGULATORY INFORMATION===========================
(NOT MEANT TO BE ALL INCLUSIVE-SELECTED REGULATIONS REPRESENTED)
US REGULATIONS:
STATUS OF SUBSTANCES LISTS:
THE CONCENTRATIONS SHOWN IN SECTION II ARE MAXIMUM CEILING LEVELS (WEIGHT %) TO BE USED FOR CALCULATIONS FOR REGULATIONS.
FEDERAL EPA: COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION & LIABILITY ACT OF 1980 (CERCLA) REQUIRES NOTIFICATION OF THE NATIONAL RESPONSE CENTER OF RELEASE OF QUANTITIES OF HAZARDOUS SUBSTANCES EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITIES (RQ'S) IN 40 CFR 302.4.

COMPONENTS PRESENT THAT COULD REQUIRE REPORTING UNDER THE STATUTE ARE:
NONE KNOWN
SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986(SARA) TITLE III
REQUIRES EMERGENCY PLANNING BASED ON THE THRESHOLD QUANTITIES (TPQ'S)
AND RELEASE REPORTING BASED ON REPORTABLE QUANTITIES (RQ'S) IN 40 CFR 355
(USED FOR SARA 302, 304, 311, AND 312)
COMPONENTS PRESENT THAT COULD REQUIRE REPORTING UNDER THE STATUTE ARE:
NONE KNOWN
REQUIRES SUBMISSION OF ANNUAL REPORTS OF RELEASE OF TOXIC CHEMICALS
THAT APPEAR IN 40 CFR 372(FOR SARA 313). THIS INFORMATION MUST BE INCLUDED
IN ALL MSDS'S THAT ARE COPIED AND DISTRIBUTED FOR THIS MATERIAL.
COMPONENTS THAT COULD REQUIRE REPORTING UNDER THE STATUTE: SEE SECTION II
THE COMPONENTS OF THIS PRODUCT ARE LISTED OR EXCLUDED FROM LISTING ON THE

US TOXIC SUBSTANCE CONTROL ACT (TSCA) CHEMICAL SUBSTANCE INVENTORY.
THE REMAINING PERCENTAGE OF UNSPECIFIED INGREDIENTS, IF ANY, ARE NOT CONTAINED
IN ABOVE DE MINIMIS CONCENTRATIONS AND/OR ARE BELIEVED TO BE NON-HAZARDOUS
UNDER THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200), AND MAY
CONSIST OF PIGMENTS, FILLERS, DEFOAMERS, WETTING AGENTS, RESINS, DRYERS,
ANTI-BACTERIAL AGENTS, WATER AND/OR SOLVENTS IN VARYING CONCENTRATIONS.
INTERNATIONAL REGULATIONS:

CANADIAN WHMIS:
DOES NOT CLASSIFY AS HAZARDOUS.
CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA):
NONE KNOWN
EINECS:
NO INFORMATION.
STATE REGULATIONS:
CALIFORNIA PROPOSITION 65: THE FOLLOWING STATEMENT IS MADE IN ORDER TO COMPLY
THE CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986. THIS
PRODUCT CONTAINS THE FOLLOWING SUBSTANCE(S) KNOWN TO THE STATE OF CALIFORNIA
A: CAUSE CANCER:
NONE KNOWN
B: CAUSE REPRODUCTIVE HARM:
NONE KNOWN
PENNYSYLVANIA:
NONE KNOWN
NEW JERSEY:
NONE KNOWN
OTHER:
NONE KNOWN

=================SECTION 16 OTHER INFORMATION===========================

THE INFORMATION CONTAINED HEREIN IS FURNISHED WITHOUT WARRANTY OF ANY KIND.
USERS SHOULD CONSIDER THESE DATA ONLY AS A SUPPLEMENT TO OTHER INFORMATION
GATHERED BY THEM & DETERMINE THE SUITABILITY & COMPLETENESS OF INFORMATION FROM
ALL SOURCES TO ASSURE PROPER USE & DISPOSAL OF THESE MATERIALS & THE SAFETY &
HEALTH OF EMPLOYEES & CUSTOMERS.

TAPCO

TROPICAL ASPHALT

#113 HYDRO-ALUMINUM

TROPICAL ASPHALT #113 ***HYDRO-ALUMINUM*** is a durable, water-based, specially formulated aluminum asphaltic emulsion which has been developed to resist rigorous weather conditions while protecting roof surfaces and contributing to substantial energy savings. ***HYDRO-ALUMINUM* #113** has excellent elongation and tensile strength. When properly applied, ***HYDRO-ALUMINUM* #113** reflects up to 55% of the sun's rays. **#113** prevents premature aging and roof burnout by reducing UV degradation and thermal shock. ***HYDRO-ALUMINUM* #113** dries to a flexible, slightly textured film with a beautiful metallic finish, which will significantly slow down the aging of the roof system. ***HYDRO-ALUMINUM* #113** is recommended for use on metal, smooth BUR, mineral surface, emulsion, composition shingle, and modified roof systems.

PREPARATION: Surface must be dry and free of dirt, dust, oil, grease, wax, rust, chalky or loose paint, mildew and any other surface contamination that may inhibit adhesion. Repair cracks, breaks, open seams, and other roof imperfections with a heavy sealer such as #950 Eternamastic or recommended caulking or flashing compounds. When coating over newly applied asphalt emulsions such as #360 Asphalt Emulsion, proceed when the emulsion is thoroughly dry and cured. ***HYDRO-ALUMINUM* #113** performs best when applied over new asphalt emulsion surfaces. The curing time of asphalt emulsion is 3 to 10 days in warm, dry weather.

APPLICATION: Clean surfaces thoroughly before applying **#113** ***HYDRO-ALUMINUM***, scrubbing with a detergent solution if necessary to remove oils and other residues. Flush immediately with a strong stream of water. Make sure wastewater is disposed of in accordance with all applicable environmental safety regulations. Stir thoroughly to ensure uniform application by brush or spray. Roller is less effective. For best results spray apply. If brushing, use a 24-inch wide soft bristle broom. Apply uniformly over entire roof surface. ***HYDRO-ALUMINUM* #113** may be applied over a damp (not wet) surface. Apply only when coating will not be subject to heavy dew, rain, or moisture within 72 hours of application. It may be necessary to cool down a very hot roof by sprayi g water to prevent excessively fast drying of the coating.

COVERAGE: BUR—75 sq.ft. per gallon; Metal Roofing, smooth surfaces, emulsion surface—100 sq.ft. per gallon; Composition shingles and capsheet—35-50 sq.ft. per gallon. Coverage rates may vary depending on texture of surface.

PRECAUTIONS: Do not apply **#113** ***HYDRO-ALUMINUM*** when surface or ambient temperature is less than 55°F, or if cold weather, rain or fog is expected within 72 hours of application. When applied properly, **#113** is an excellent water repellant product. Nevertheless, **#113** is not recommended on surfaces that pond water. Do not apply **#113** ***HYDRO-ALUMINUM*** over asphalt emulsion prematurely. If **#113** is applied over uncured asphalt emulsion, it may turn gray, dark gray, or brown. Do not apply **#113** in the late afternoon or evening when the ambient temperature is low, if rain is imminent or dew is expected to form. This could cause graying, browning, or eggshell crazing. Drying time may vary depending upon wet film thickness, temperature, humidity, and air movement.

Base:	Asphalt Emulsion-ASTM D1227 Type III	**Weatherability:**	Excellent
Pigment:	Highly Polished Aluminum Flake	**Flexibility:**	Excellent
Flammability:	Wet-non flammable, Dry-Class A	**Weight Per Gallon:**	Approx. 8.5#
Spectral Reflectance:	88% avg. ASTM E97-77	**Application Temperature:**	Min. 55°F
Elongation:	166% ASTM D412	**Tensile Strength:**	31 psi -ASTM D412
Drying Time:	(70°F @ 50% r.h.) @ 100 sg.ft./gal=1 hour	**Container Sizes:**	5 Gallon, 55 Gallon

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La Mirada, CA 90638
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Toll Free 1-877-827-2622

1904 S. 31st Avenue
Hallandale, Florida 33009
954-983-3434 * FAX: 954-963-2033
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Port Arthur, Texas 77640
409-727-0091~409-727-4647FAX
TOLL FREE 866-727-0091

www.tropicalasphalt.com

MATERIAL SAFETY DATA SHEET

TROPICAL ASPHALT

	#113 HYDRO ALUMINUM
Manufacturer: Tropical Asphalt, L.L.C.	**Identify (Trade Name As Used on Label):** TAPCO #113
Address: 14435 Macaw Street	**MSDS Number*:** 113-1
La Mirada, California 90638	**CAS Number*:** N/A - Mixture
Phone Number (For Information): (714) 739-1408	**Date Prepared:** May 25, 2000
Emergency Phone Number: (714) 739-1408	

SECTION 1 - MATERIAL IDENTIFICATION AND INFORMATION

COMPONENTS - Chemical Name & Common Names (Hazardous Components 1% or Greater, Carcinogens 0.1% or Greater)	**%***	**OSHA PEL**	**ACGIH TLV**	**OTHER LIMITS RECOMMENDED**
Water	<65%	N/A	N/A	N/A
Clay (Siliceous Materials)	<5%	ND	ND	N/A
Crystalline Silica (as dust)	<0.1%	0.01mg/m^3	0.01mg/m^3	N/A
Aluminum Flake	<12.0%	10 mg/m^3	10 mg/m^3	N/A
Stoddard Solvent	<1.5%	525 mg/m^3	525 mg/m^3	N/A
1 - Nitropropane	<1.2%	90 mg/m^3	90 mg/m^3	N/A
Asphalt (TLV is for fumes when heated)	<18%	5 mg/M^3	5 mg/M^3	N/A

SECTION 2 - PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point:	212°F	Specific Gravity (H_2O = 1):	1.0
Vapor Pressure (mm Hg and Temperature):	17	Melting Point:	ND
Vapor Density (Air = 1):	>1	Evaporation Rate (Butyl Acetate = 1):	<1
Solubility in Water:	Dissolves in water	% Volatile by Weight:	60-65% (water)
Appearance and Odor: Silver/gray, viscous liquid.		Maximum V.O.C.: 100 grams/liter	

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

Flash Point: N/A **Method Used:**	**Auto-Ignition Temperature:** N/A	**Flammability Limits in Air % by Volume**	**LEL:** 0.0%	**UEL:** 0.0%

Extinguisher Media: Not required (water-based liquid will not burn).

Special Fire Fighting Procedures: Use breathing apparatus in enclosed areas. Do not use water hose stream, aluminum particles suspended in air may form an explosive mixture. If metal begins to burn with bright whitish glow do not attempt to extinguish it. Isolate it with dry sand or class D agent and let it burn out.

Unusual Fire and Explosion Hazards: Dried product can burn. Use class B dry chemical or class D extinguishers. DO NOT USE HALOGENATED FIRE EXTINGUISHING AGENTS.

* = Optional ND = Not Determined OSHA 174

SECTION 4 - REACTIVITY HAZARD DATA

Stability: Stable _x_ Unstable ____	**Conditions to Avoid:** Heat.
Incompatibility (Materials to Avoid): Some acids, some caustics, halogenated hydrocarbons containing amines, lead or copper.	
Hazardous Decomposition Products: Smoke, carbon monoxide, carbon dioxide, aluminum oxide, ammonia, and nitrogen oxide.	
Hazardous Polymerization: ___ May Occur _X_ Will Not Occur	

SECTION 5 - HEALTH HAZARD DATA

Primary Routes of Entry: None ___ **Inhalation:** ___ **Skin Absorption:** ___ **Ingestion:** ___ **Not Hazardous:**	This product has not been classified as a carcinogen by the Occupational Safety and Health Administration (OSHA) or the National Toxicology Program (NTP).
Health Hazards	**Acute:** No evidence of adverse effects from available information. **Chronic:** No evidence of adverse effects from available information.

Signs and Symptoms of Exposure: Mild irritation or redness if prolonged exposure to skin and eyes.

Medical Conditions Generally Aggravated by Exposure: Repeated/continuous exposure can aggravate pre-existing eye and skin disorders.

EMERGENCY FIRST AID PROCEDURES:

Eye Contact: Flush eyes for 15 minutes with clean water.

Skin Contact: Wash with soap and water.

Inhalation: Residual monomer vapors may be irritating to eyes, mucous membranes and respiratory tract. May produce symptoms of headache and nausea in poorly ventilated areas. Remove to fresh air.

Ingestion: Should not occur. If swallowed, do not induce vomiting, consult physician.

SECTION 6 - CONTROL AND PROTECTIVE MEASURES

Respiratory Protection (Specify Type): If mist is present or if sprayed in enclosed areas, use MSHA/NIOSH approved mask for mist.

Protective Gloves: None required. Impervious to water, if desired.		**Eye Protection:** Safety glasses or goggles to prevent splashing, available eyewash.
Ventilation To Be Used:	If spraying in enclosed area, maintain proper ventilation to keep air contaminant below permissible exposure limit.	**Other Protective Clothing and Equipment:** None normally required, protective clothing to avoid skin contact, if desired.

Hygienic Work Practices: Avoid prolonged or repeated contact with skin. Remove contaminated clothing and launder or dry clean before reuse. Cleanse skin thoroughly after contact, before breaks and meals. Product is readily removed from skin with waterless hand cleaners followed by thoroughly washing with soap and water.

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE/LEAK PROCEDURES

Steps to be Taken if material is Spilled or Released: Dike and absorb with absorbent material. Prevent material from entering sewers or open bodies of water. ASSURE CONFORMITY WITH ALL APPLICABLE GOVERNMENTAL REGULATIONS. Let dry in safe place.

Waste Disposal Methods: Consult local, state, and federal regulations for permitted disposal and dispose of accordingly.

Precautions to be Taken in Handling and Storage: Avoid high temperatures and extreme heat, store containers in cool dry area away from direct sunlight. KEEP FROM FREEZING. Keep container upright & closed.

Other Precautions and/or Special Hazards: Do not take internally. Avoid contact with skin/eyes. Close container after use. Keep out of reach of children.
HMIS Rating: Health-1 Flammability-1 Reactivity-2

TROPICAL ASPHALT

#360 ASPHALT EMULSION

TROPICAL ASPHALT #360 Asphalt Emulsion is a versatile, protective water based roof and waterproof coating. #360 is a solvent free, all purpose, non fibered coating ideal for use as a surface coating for built up roofing, metal, and masonry surfaces, and for pipes and tanks above or below ground level. #360 is made from asphalt emulsified with bentonite clay and water. #360 is cold-applied, corrosion-resistant, non-flammable while wet, and waterproof when dry, while also resisting most corrosive fumes and spray. #360 will not run, sag, crack, or "alligator," under the harshest of weather conditions. Complies with ASTM D-1227-95 Type III, Class I. #360 Asphalt Emulsion is available in 5-gallon pails, 55-gallon drums, and 250-gallon totes.

PREPARATION: All surfaces must be clean, have proper drainage, and be free from rust, dirt, and all other foreign matter. Remove rust with wire brush. A better bond will result if surface is damp when #360 is applied, but surface must be free of standing water. Clean all cracks, holes and damaged areas, repairing when necessary and allow repairs to thoroughly cure.

APPLICATION: Apply #360 by roofing brush, roller, or spray, evenly covering the surface. Two coats are recommended. Allow to dry completely between coats. Dry time is usually 6-24 hours in dry and hot weather conditions. In cool, damp weather drying will be slower, 2 – 7 days.

COVERAGE: #360 should be applied at a rate of 2 – 3 gallons per 100 square feet, dependent upon roof surface.

PRECAUTION: *DO NOT ALLOW #360 TO FREEZE.* Do not apply when ambient temperature is below 55°F, or if there is a threat of rain, heavy dew, or temperatures below 40°F within 24-48 hours. Do not heat container or store at temperatures greater than 120°F. Application over hot applied asphalt may not prevent alligatoring. This coating is not recommended over gravel, rubber or PVC sheet roofing, or old roofs that are too dry and brittle. When transporting this product, be sure the pail is secured and the lid is tight. Do not allow pail to tumble as this may loosen the lid and allow leakage to occur.

CLEAN UP: Fresh coating can be removed with warm water and soap. If material has started to dry, use mineral spirits or paint thinner.

CAUTION: DO NOT TAKE INTERNALLY! KEEP OUT OF REACH OF CHLDREN. Use protective measures to avoid contact with eyes and skin. If swallowed, CALL PHYSICIAN IMMEDIATELY! In case of eye contact, open eyelids wide and flush immediately with plenty of water for at least 15 minutes. GET MEDICAL ATTENTION! Close container after each use.

MAX V.O.C. 30 grams per liter

TROPICAL ASPHALT

14435 Macaw Street
La Mirada, CA 90638
714-739-1408 * FAX 714-670-1605
Toll Free 1-877-827-2622

1904 S. 31st Avenue
Hallandale, Florida 33009
954-983-3434 * FAX: 954-963-2033
Toll Free: 1-800-432-2855

1225 Brai Drive ~ P. O. Box 5335
Port Arthur, Texas 77640
409-727-0091~409-727-4647FAX
Toll Free 866-727-0091

www.tropicalasphalt.com

MATERIAL SAFETY DATA SHEET

TROPICAL ASPHALT

	#360 Asphalt Emulsion
Manufacturer: Tropical Asphalt, L.L.C.	**Identify (Trade Name As Used on Label):** TAPCO #360
Address: 14435 Macaw Street	**MSDS Number*:** 360-1
La Mirada, California 90638	**CAS Number*:** N/A - Mixture
Phone Number (For Information): (714) 739-1408	**Date Prepared:** October 25, 1990
Emergency Phone Number: (714) 739-1408	**Revised On:** October 1, 1999

SECTION 1 - MATERIAL IDENTIFICATION AND INFORMATION

COMPONENTS - Chemical Name & Common Names (Hazardous Components 1% or Greater, Carcinogens 0.1% or Greater)	%*	OSHA PEL	ACGIH TLV	OTHER LIMITS RECOMMENDED
Water	<55%	N/A	N/A	N/A
Clay (Siliceous Materials)	<10%	ND	ND	N/A
Crystalline Silica (as dust)	<1.0%	0.01mg/M^3	0.01mg/M^3	N/A
Asphalt (TLV is for fumes when heated)	<45%	5 mg/M^3	5 mg/M^3	N/A

SECTION 2 - PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point:	212°F	Specific Gravity (H_2O = 1):	1.02
Vapor Pressure (mm Hg and Temperature):	17	Melting Point:	ND
Vapor Density (Air = 1):	>1	Evaporation Rate (Butyl Acetate = 1):	<1
Solubility in Water:	Dissolves in water	Water Reactive:	No
Appearance and Odor: Brown, viscous liquid with mild asphaltic odor.			

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

Flash Point: N/A **Method Used:**	**Auto-Ignition Temperature:** N/A	**Flammability Limits in Air % by Volume**	**LEL:** 0.6%	**UEL:** 15.3.0%
Extinguisher Media: Not required (water-based liquid will not burn).				
Special Fire Fighting Procedures: Use breathing apparatus in enclosed areas.				
Unusual Fire and Explosion Hazards: Dried product can burn. Use water, foam CO^2, or dry chemical extinguishers.				

SECTION 4 - REACTIVITY HAZARD DATA

Stability: Stable _x_ Unstable	**Conditions to Avoid:** None known.
Incompatibility (Materials to Avoid): None known	
Hazardous Decomposition Products: None known	
Hazardous Polymerization: ___ May Occur _X_ Will Not Occur	**Conditions to Avoid:** None.

SECTION 5 - HEALTH HAZARD DATA

Primary Routes of Entry: None ___ **Inhalation:** ___ **Skin Absorption:** ___ **Ingestion:** ___ **Not Hazardous:**		Carcinogen Listed in: ___ NTP ___ IARC Monograph ___ OSHA _x_ Not Listed
Health Hazards	**Acute:** No evidence of adverse effects from available information.	
	Chronic: No evidence of adverse effects from available information.	
Signs and Symptoms of Exposure: Mild irritation or redness if prolonged exposure to skin and eyes.		
Medical Conditions Generally Aggravated by Exposure: Repeated/continuous exposure can aggravate pre-existing eye and skin disorders.		
EMERGENCY FIRST AID PROCEDURES:		
Eye Contact: Flush eyes for 15 minutes with clean water.		
Skin Contact: Wash with soap and water.		
Inhalation: Should not occur. Get to fresh air.		
Ingestion: Should not occur. If large amount is swallowed, consult physician.		

SECTION 6 - CONTROL AND PROTECTIVE MEASURES

Respiratory Protection (Specify Type): Not normally required.		
Protective Gloves: None required. Impervious to water, if desired.		**Eye Protection:** Safety glasses or goggles to prevent splashing, available eye wash.
Ventilation To Be Used:	None under normal conditions, mechanical is sprayed in enclosed areas.	
Other Protective Clothing and Equipment: None normally required.		
Hygienic Work Practices: Avoid prolonged or repeated contact with skin. Remove contaminated clothing and launder or dry clean before reuse. Cleanse skin thoroughly after contact, before breaks and meals. Product is readily removed from skin with waterless hand cleaners followed by thoroughly washing with soap and water.		

SECTION 7 - PRECAUTIONS FOR SAFE HANDLING AND USE/LEAK PROCEDURES

Steps to be Taken if material is Spilled or Released: Dike and absorb with absorbent material. Prevent material from entering sewers or open bodies of water. ASSURE CONFORMITY WITH ALL APPLICABLE GOVERNMENTAL REGULATIONS. Let dry in safe place.

Waste Disposal Methods: Consult local, state, and federal regulations for permitted disposal and dispose of accordingly.

Precautions to be Taken in Handling and Storage: Avoid high temperatures and extreme heat Keep from freezing. Keep container upright & closed.

Other Precautions and/or Special Hazards: Do not take internally. Avoid contact with skin/eyes. Close container after use. Keep out of reach of children.

PROMAR®

EXTERIOR SOLID COLOR ACRYLIC LATEX STAIN
A16 SERIES

SURFACE PREPARATION

Steel—Remove rust and mill scale using sandpaper, steel wool, or other abrading method. 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 Masonry Primer. Repair cracks, voids, and other holes using ConSeal Patches and Sealants.
Bleeding Woods, Abraded Plywood, and Composition Board—Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth.
Other Woods, Plywood–Sand exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth.
Mill Glaze is a glossy finish on new, smooth sawn wood or on the peaks of some textured wood. Remove this by sanding to allow the stain to penetrate.
Mildew—Remove before painting by washing with ProClean Professional™ 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/siding and windows, doors, and other through-wall openings and other exterior trim can be filled with Pro Select® Acrylic Latex Caulk after priming the surface.

APPLICATION

Apply at temperatures above 50°F.
No reduction necessary.
Brush
Use a nylon/polyester brush, or appropriate stain applicator.
Roller
Use a ½" - 1" nap synthetic roller cover.
Spray—Airless
Pressure ....1800-2400 psi
Tip .... .013"-.021"

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

Protect from freezing.
Non-photochemically reactive.
For exterior use only.
For vertical surfaces only.
Not for use on roofs, decks, or other surfaces where water will accumulate.
For wood decks and patios, use Cuprinol Solid Color Deck Stain

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 approved) 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 approved). 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, Call Poison Control Center, hospital emergency room, or physician 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 and birth defects or other reproductive harm. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
LCE 10/15/01 A16W251 02 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.

Material Safety Data Sheet

Document Code: PMExterior-Latex
Version: 01

Date of Preparation
September 12, 2001

Section 1 - Product and Company Identification

PRODUCT NAME & NUMBERS
PROMAR Exterior Solid Color Acrylic Latex Stain

Base C	A16G203	Base A	A16W201
Cape Cod Red	A16R201	Extra White	A16W251
Burgundy	A16R233	Base B	A16Y202
White	(A16W200)		

HMIS CODES

Health	1*
Flammability	0
Reactivity	0

MANUFACTURER'S NAME
THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

EMERGENCY TELEPHONE NO.
(216) 566-2917
INFORMATION TELEPHONE NO.
(216) 566-2902

Section 2 – Composition/Information on Ingredients

% WT.	CAS No.	Ingredient Name				Vapor Pressure
15-21	14808-60-7	**Quartz**				
		ACGIH	TLV	0.05	mg/m3 as Respirable Dust	
		OSHA	PEL	0.05	mg/m3 as Respirable Dust	
1-2	14464-46-1	**Cristobalite**				
		ACGIH	TLV	0.05	mg/m3 as Respirable Dust	
		OSHA	PEL	0.05	mg/m3 as Respirable Dust	
0-13	13463-67-7	**Titanium Dioxide.**				
		ACGIH	TLV	10	mg/m3 as Dust	
		OSHA	PEL	10	mg/m3 Total Dust	
		OSHA	PEL	5	mg/m3 Respirable Fraction	
0-1	1314-13-2	**Zinc Oxide**				
		ACGIH	TLV	10	mg/m3 as Dust	
		OSHA	PEL	10	mg/m3 Total Dust	
		OSHA	PEL	5	mg/m3 Respirable Fraction	
0-0.5	1333-86-4	**Carbon Black.**				
		ACGIH	TLV	3.5	mg/m3	
		OSHA	PEL	3.5	mg/m3	
<2% due	107-21-1	**Ethylene Glycol.**				
to tinting		ACGIH	TLV	50	ppm CEILING	0.1 mm
		OSHA	PEL	50	ppm CEILING	
<2% due	1332-58-7	**Kaolin**				
to tinting		ACGIH	TLV	2	mg/m3 as Respirable Dust	
		OSHA	PEL	10	mg/m3 Total Dust	
		OSHA	PEL	5	mg/m3 Respirable Fraction	
<2% due	14807-96-6	**Talc**				
to tinting		ACGIH	TLV	2	mg/m3 as Respirable Dust	
		OSHA	PEL	2	mg/m3 as Respirable Dust	

- Continued -

Section 3 – Hazards Identification

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.

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.

CANCER INFORMATION

For Complete Discussion of Toxicology Data Refer to Section 11.

Section 4 – First Aid Measures

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:	Do not induce vomiting. Get medical attention immediately.

Section 5 – Fire Fighting Measures

FLASH POINT	LEL	UEL
None	N.A.	N.A.

FLAMMABILITY CLASSIFICATION

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 6 – Accidental Release Measures

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate and remove with inert absorbent.

Section 7 – Handling and Storage

DOL STORAGE CATEGORY - Not Applicable

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

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.

- Continued -

Section 8 – Exposure Controls/Personal Protection

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).

Removing or disturbing old paint from interior or exterior surfaces by sanding, scraping, abrading or other means may produce dust, debris or fumes that contain lead. Exposure to lead dust, debris or fumes may cause brain damage or other adverse health effects, especially in children and pregnant women. Structures built before 1978 should be tested by a licensed inspector prior to removing or disturbing old paint. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.

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 – Physical and Chemical Properties

PRODUCT WEIGHT	10.0-10.7 lb/gal	EVAPORATION RATE	Slower than Ether
SPECIFIC GRAVITY	1.20-1.29	VAPOR DENSITY	Heavier than Air
BOILING POINT	212-477 °F	MELTING POINT	N.A.
VOLATILE VOLUME	68-72 %	SOLUBILITY IN WATER	N.A.
pH	9.0		

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical)

0.8-0.9 lb/gal	Less Federally Exempt Solvents
0.3 lb/gal	Emitted VOC

Section 10 – Stability and Reactivity

STABILITY - Stable

CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION - Will not occur

- Continued -

Section 11 – Toxicological Information

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.

Rats exposed to titanium dioxide dust at 250 mg./m3 developed lung cancer, however, such exposure levels are not attainable in the workplace.

TOXICOLOGY DATA

CAS No.	Ingredient Name			
14808-60-7	**Quartz**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		Not Established
14464-46-1	**Cristobalite**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		Not Established
13463-67-7	**Titanium Dioxide.**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		>7500 mg/kg
1314-13-2	**Zinc Oxide**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		Not Established
1333-86-4	**Carbon Black.**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		>15400 mg/kg
107-21-1	**Ethylene Glycol.**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		4700 mg/kg
1332-58-7	**Kaolin**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		Not Established
14807-96-6	**Talc**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		Not Established

Section 12 – Ecological Information

ECOTOXICOLOGICAL INFORMATION

No data available.

Section 13 – Disposal Considerations

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/Provincial, and Local regulations regarding pollution.

- Continued -

Section 14 – Transport Information

DOT PROPER SHIPPING DESCRIPTION: Paint and Related Materials, NOIBN

IATA/IMDG SHIPPING DESCRIPTION: Paint and Related Materials, NOIBN

Section 15 – Regulatory Information

SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
107-21-1	Ethylene Glycol.	<2	
	Zinc Compound.	0-1	0-0.9

CALIFORNIA PROPOSITION 65
WARNING: These products contain a chemical 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.

Section 16 – Other Information

CANADIAN DISTRIBUTOR: Sherwin-Williams Canada
180 Brunel Rd.
Mississauga, ON L4Z 1T5

NOTE: These products have been classified in accordance with the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR

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

Stain

PRODUCT DATA SHEET

Exterior Acrylic Solid Color Rustic Stain 4301

GENERAL INFORMATION

Product Description
A premium quality, acrylic solid stain designed for exterior use over wood, masonry, concrete, stucco, properly primed metal and previously painted surfaces. Provides excellent protection for rustic wood surfaces such as rough sawn lumber, vertical shakes and shingles, fences, and masonite or hardboard siding. It hides the surface without obscuring the grain, texture or rustic effects.

Performance Characteristics
- Will not obscure grain, texture or rustic effects
- Easy application
- Superior color retention
- Durable
- Easy clean-up

Surface Preparation

Previously Painted Surfaces
All surfaces must be clean, dry and free from dirt, wax, grease, oil, chalk, mildew and loose or peeling paint. Nail holes, cracks or other surface imperfections should be properly filled, sanded smooth and dusted clean. All mildew, mold and fungi must be completely and thoroughly removed. Moderately to heavily chalked surfaces require removal of chalk and priming with a surface conditioner. Glossy surfaces must be sanded and dusted clean. Always wear a dust mask when sanding.

Masonry
New masonry must cure 30 days and be free of efflorescence and alkali before painting. If pH is greater than 8.0, prime with Morwear 2099 100% Acrylic Masonry Primer. For best results on masonry, concrete and stucco in hot weather, hose down with water to remove dust and dirt and to pre-wet surface. Allow excess water to evaporate before applying finish coat.

Metal
All metal surfaces must be clean and free of rust, grease, oil, dirt and other foreign matter. If any loose or peeling material is present, it must be thoroughly removed by means of scraping, sanding or wire brushing. Prime all bare spots with Morwear Rust Inhibiting Alkyd Metal Primer 4182 Red Oxide or 4183 White.

New Wood
Glossy surfaces must be sanded and dusted clean. Sand rough areas. All bare wood must be wiped clean and primed with Morwear 485 Oil Base Wood Primer with Busan or 2098 100% Acrylic Stain Blocking Primer.

Application Suggestions
IMPORTANT! READ BEFORE APPLICATION:
If more than one package of the same color is to be used, mix together before applying to ensure uniform color and finish. Apply paint to a small test area on surface for color approval BEFORE painting entire surface. Seller is not responsible for color differences after paint is applied.
STIR WELL BEFORE USING. May be applied by brush, roller or spray. When spraying, follow spray equipment manufacturer's recommendations carefully. Apply two full coats for maximum durability. Apply only when the temperature of the surface, material and air is above 50 F. Do not apply if rain or heavy dew is expected within 24 hours.
NOTICE: Some redwood, cedar and fir may contain excessive amounts of *Tannins* (water soluble color staining bodies) which can bleed through and discolor the finish, especially white and light colors. If this occurs, allow the paint to dry thoroughly. Then apply one coat of stain-inhibiting primer to the discolored areas. Allow primer to dry thoroughly. Apply an additional coat of finish.

HEALTH & SAFETY INFORMATION

CAUTION!

Do not take internally. Use only with adequate ventilation. Avoid breathing vapor, spray mist or sanding dust. CONTAINS CRYSTALLINE SILICA. Sanding dust may cause eye and skin irritation. Avoid contact with eyes. Avoid prolonged or repeated contact with skin. Long term exposure to Crystalline Silica may cause lung damage and cancer; risk depends upon duration and level of exposure to sanding dust.
This product contains chemical(s) known to the State of California to cause cancer and birth defects or other reproductive harm (Prop. 65).

Disposal Information

Please use all of the paint before disposing of the container. If no paint can be poured or drained from the container, dispose of the dry, empty container as you would normal household waste. Store any excess product in a tightly sealed container away from heat or flames. To dispose of a full or partially full container of paint, contact your city or county government for hazardous materials collection locations and operating hours. Do not dispose of excess paint in any sanitary or storm water sewer system.

Environmental Considerations

Formulated without lead, mercury or chromium.

TECHNICAL INFORMATION

APPLICATION EQUIPMENT

Brush Type:	Polyester, Nylon
Roller Cover:	Synthetic
Nap size:	
Light Texture	3/8" – 1/2" nap
Medium Texture	1/2" – 3/4" nap
Heavy Texture	3/4" – 1" nap
Spray Equipment:	Heavy-duty piston 2000 PSI minimum
Spray Tip Size:	.015 to .019
P.S.I.:	2000
Filter:	60 mesh

VISCOSITY: 95-100 KU
GLOSS: Flat

THINNING: If necessary, add no more than ½ pint of water per gallon. DO NOT USE PAINT THINNER.

DRY TIME: Dries in 30 minutes to one hour depending on temperature and humidity. Allow four hours before recoating.

DESIRED FILM THICKNESS:
Wet - 4.6 mils
Dry - 1.9 mils

COVERAGE: Approximately 300-400 square feet per gallon depending on surface texture and porosity.

CLEAN-UP: Clean brushes, rollers and equipment with soap and water. Clean spills and spatter immediately.

WEIGHT PER GALLON: 11.53

FLASH POINT: None

CONTENT ANALYSIS:

Solids by volume	42.43%
Solids by weight	56.75%
Pigment by Weight:	38.82%
Vehicle by Weight:	61.18%

EQUIVALENT FEDERAL SPECIFICATIONS:
Meets the performance requirements, not necessarily composition, of Federal Specification:TT-S-001992

INGREDIENTS	CAS #
Titanium Dioxide	13463-67-7
Acrylic Resin Emulsion	25067-01-0
Styrene Acrylic Emulsion	Contents Unknown
Calcium Carbonate	1317-65-3
Water	7732-18-5
Zinc Compound	7440-66-6
Ethylene Glycol	107-21-1
Crystalline Silica	14808-60-7

Revised 1/14/2003

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: PASTEL BASE, EXT ACRYLIC RUSTIC STAIN
PRODUCT CODE: 4301-01

HMIS CODES:	H	F	R	P
	1*	0	0	B

SECTION I - MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME: SMILAND PAINT COMPANY
ADDRESS : 620 LAMAR STREET
LOS ANGELES, CA. 90031-2513

EMERGENCY PHONE	: (800) 535-5053	DATE PRINTED	: 10/15/02
INFORMATION PHONE	: (323) 222-7000	NAME OF PREPARER	: Gregg Lindblom
SUPERSEDES DATE	: April 12, 1999	REVISION DATE	: December 5, 2000

SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION

REPORTABLE COMPONENTS	CAS NUMBER	VAPOR PRESSURE mm Hg	@ TEMP	WEIGHT PERCENT
ISOMORPHIC HYDROUS ALUMINUM POTASSIUM SILICATE	12001-26-2	N/A	N/A	2.06
ACGIH/TWA: 20mmpcf; ACGIH/STEL: 3mg/m3 RESPIRABLE DUST				
* ZINC COMPOUND(S)	7440-66-6	N/A	N/A	1.6
ACGIH TLV: 10MG/M3 AS DUST; ACGIH PEL: 10MG/M3 AS DUST				
* ETHYLENE GLYCOL	107-21-1	.06	77 F	1.5
ACGIH TLV: 50PPM				
GLYCOL ETHER	TRADE SECRET	N/E	N/E	0.11
NONE ESTABLISHED				

* 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: 387 F
SPECIFIC GRAVITY (H2O=1): 1.38
VAPOR DENSITY: Lighter than air.
EVAPORATION RATE: Slower than ether.
COATING V.O.C.: 97 g/l
MATERIAL V.O.C.: 43 g/l
SOLUBILITY IN WATER: Complete.
APPEARANCE AND ODOR: Typical for water based paints.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: Not Applicable.
METHOD USED: Not Applicable.

FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 3.2 UPPER: 15.3

EXTINGUISHING MEDIA: Foam, CO2, Dry Chemical, or Water Fog.

SPECIAL FIREFIGHTING PROCEDURES
Cool containers with water spray.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed container exposed to high temperatures may explode or burst due to build up of steam pressure.

SECTION V - REACTIVITY DATA

STABILITY: Stable.
CONDITIONS TO AVOID
None.

INCOMPATIBILITY (MATERIALS TO AVOID)
Avoid contact with strong oxidizing agents.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS

May form toxic materials on thermal decomposition including Carbon Dioxide, Carbon Monoxide, and various hydrocarbons.

HAZARDOUS POLYMERIZATION: Will not occur.

==================== SECTION VI - HEALTH HAZARD DATA ======================

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Adverse health effects from vapors or spray mists in poorly ventilated areas may include irritation of the mucous membranes of the nose, throat, and respiratory tract and symptoms of headache and nausea.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
EYES: In direct contact, may cause irritation. SKIN: Prolonged and repeated contact with product may cause skin irritation.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Redness, drying of the skin, or other signs of irritation or contact dermatitis.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Can cause gastrointestinal irritation, nausea, vomiting, and diarrhea.

HEALTH HAZARDS (ACUTE AND CHRONIC)
ACUTE: May cause irritation to skin and eyes, gastrointestinal irritation, nausea, and vomiting. CHRONIC: Prolonged or repeated exposure above TLV may result in permanent brain and nervous system damage.

CARCINOGENICITY: NTP CARCINOGEN: No IARC MONOGRAPHS: No OSHA REGULATED: No

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
May be aggravating to some skin and respiratory conditions, and to pre-existing liver and/or kidney disorders.

EMERGENCY AND FIRST AID PROCEDURES
EYES: Flush with large amounts of water for at least 15 minutes. Take to a physician. SKIN: Wash affected areas with soap and water. Remove contaminated clothing. If irritation persists, consult physician. INHALATION: Remove to fresh air. Treat symptomatically. Consult physician. INGESTION: Drink 1 or 2 glasses of water to dilute. DO NOT INDUCE VOMITING. CONSULT A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY. TREAT SYMPTOMATICALLY.

=========== SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE ============

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Dike, contain, or absorb with inert materials. Transfer to containers for recovery or disposal. Prevent runoff into sewers, streams, or other bodies of water.

WASTE DISPOSAL METHOD
Dispose of in accordance with all local, state and federal regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Do not expose to extremes in temperature. Avoid exposure to high temperatures. DO NOT ALLOW TO FREEZE.

OTHER PRECAUTIONS
DO NOT TAKE INTERNALLY. Avoid prolonged or repeated exposure to levels above TLV. KEEP OUT OF REACH OF CHILDREN.

==================== SECTION VIII - CONTROL MEASURES =====================

RESPIRATORY PROTECTION
Not normally required. If TLV is exceeded, use NIOSH/MSHA approved organic

vapor and mist, supplied air, or self-contained breathing apparatus. Avoid breathing sanding dust.

VENTILATION
Use adequate mechanical (general and/or local) ventilation to maintain exposure below TLV.

PROTECTIVE GLOVES
Wear resistant gloves such as polyethylene.

EYE PROTECTION
Use chemical splash goggles or OSHA permitted safety glasses.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT
Wear impervious clothing. Eye wash station.

WORK/HYGIENIC PRACTICES
Wash hands before eating or using restrooms. Remove and wash all contaminated clothing before reuse.

======================== SECTION IX - DISCLAIMER ==========================

The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees.

PRODUCT INFORMATION

ACRI-FLAT®
100% Acrylic
Exterior Wood Stain & Masonry Flat Paint
W 704

DESCRIPTION: **ACRI-FLAT** is a 100% acrylic flat paint that is easy to apply, provides dependable performance, excellent color retention and good grain crack resistance for long-term exterior durability. Its "dead-flat" finish minimizes surface imperfections making it an ideal flat to use on areas where previous patchwork has been performed. **ACRI-FLAT** is extremely versatile and is ideally suited as a self-priming solid color stain for new or previously painted rough sawn wood and is also recommended for use on properly prepared masonry, concrete, tilt-up, block, stucco, plaster and exterior metal.

SPECIFICATIONS

SOLVENT TYPE
Waterborne

RESIN TYPE
100% acrylic

FINISH
Flat. 1-2% on a 60° meter.

COLORS
Stock colors: White. Other colors can be special ordered or store mixed.

BASES
White, medium, ultra deep

VISCOSITY AT 77°F (25°C)
105-110 Ku

VOC CONTENT
120 g/L (as supplied)

SOLIDS BY VOLUME
40.0%

SOLIDS BY WEIGHT
56.0%

WEIGHT PER GALLON
11.30 lbs.

COMPOSITION BY WEIGHT

Pigment - 35.0%		Vehicle - 65.0%	
*Prime pigments	21.0	Acrylic resins	17.0
Reinforcing pigments	14.0	Water & additives	46.0

** Prime pigments include titanium dioxide (TiO_2), plus all other pigments directly adding to the hiding power of this paint.*

RECOMMENDED FILM THICKNESS PER COAT
Wet: 3.8 mils Dry: 1.5 mils

PRACTICAL COVERAGE PER COAT AT RECOMMENDED DRY FILM THICKNESS
300-400 sq. ft. per gallon, depending on surface conditions.

AVERAGE DRY TIME AT 77°F (25°C)

To touch:	2 hours
Tack-free:	2-3 hours
Recoat:	4 hours
To handle:	8 hours

APPLICATION EQUIPMENT
Brush, roller, airless spray

PACKAGING
One-gallon, five-gallon containers

MATERIAL SAFETY DATA SHEET
Form #1

SURFACE PREPARATION

All surfaces must be cured, clean, dry, and free from dirt, dust, rust, stains, grease, oil, mildew, wax, efflorescence and other contaminants. Remove all loose, peeling, or chalky paint by sanding, scraping, high-pressure washing or other appropriate methods. Repair all cracks, holes, and other surface imperfections with a suitable patching material. Repaired surfaces should match the surrounding surface texture. If efflorescence exists, remove all noticeable deposits and prime the entire surface with **Super-Loc (W 718) - Waterborne Epoxy Primer or Eff-Stop (W 709) - Acrylic Masonry Sealer.**

SPECIAL INSTRUCTIONS

- Certain woods, such as redwood, cedar and spruce contain water-soluble extracts (tannins) that may discolor lighter colors. In these situations it is recommended to prime the wood with **E-Z Prime (W 708) - Exterior Acrylic Wood Primer** before applying **Acri-Flat (W 704)**.
- Do not apply when the air or surface temperature is below 50°F.

THINNING RECOMMENDATIONS
Not recommended.

CLEANUP
Water

PRIMERS

MASONRY

Stucco:	**Super-Loc (W 718) or Eff-Stop (W 709)**
Tilt-up concrete:	**Super-Loc (W 718) or Eff-Stop (W 709)**
Poured-in-place:	**Super-Loc (W 718) or Eff-Stop (W 709)**
Concrete block:	1st coat: **Blocfil (W 304) or (W 305)** 2nd coat: **Super-Loc (W 718) or Eff-Stop (W 709)**
Brick:	**Super-Loc (W 718) or Eff-Stop (W 709)**
Smooth trowel:	**Super-Loc (W 718) or Enduraseal (W 360)**

WOOD

Smooth trim:	**Self priming *(See Special Instructions)***
Rough-sawn:	**Self priming *(See Special Instructions)***

SYNTHETIC WOOD

Masonite:	**Compo (42-1) or M-P Prime (W 713)**
Hardboard:	**Compo (42-1) or M-P Prime (W 713)**
MDO siding:	**Compo (42-1) or M-P Prime (W 713)**
T-111 siding:	**E-Z Prime (W 708)**

METAL

Ferrous:	**Corrobar (43-5) or Bloc-Rust (43-4)**
Nonferrous:	**Galv-Alum (QD 43-7) or M-P Prime (W 713))**
Galvanized:	**Galv-Alum (QD 43-7) or M-P Prime (W 713)**

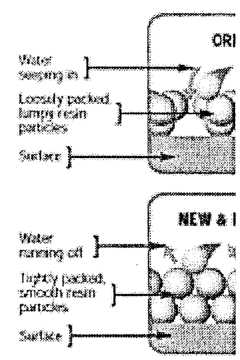
R&D center

Dunn-Edwards R&D center: dedicated to innovation

Dunn-Edwards has been a recognized leader in the paint industry throughout its 75-year history. Toda
more committed than ever to delivering quality products and creative services to meet the needs of ou

How New & Improved Acri-Flat Repels Water

New & Improved Acri-Flat's unique resin particles create a tighter paint film that does not allow water to collect and seep into the surface. As a result, New & Improved Acri-Flat forces water to bead and run off the surface.

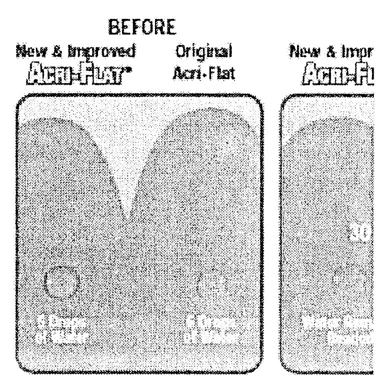


How We Compared New & Improved Acri-Flat Vs. The Original Acri-Flat:

Step 1: New & Improved Acri-Flat is applied side-by-side with original Acri-Flat on white charts.

Step 2: After allowing the paints to dry for 24 hours, five drops of water are then placed on each paint.

Step 3: After 30 minutes, the panels are evaluated to see if the water remains beaded or has seeped into the surface.



These are digital photographs of the actual test results. To view the actual test results, please contact Marketing Department.

FEATURES & BENEFITS	
FEATURE	Outstanding water repellency
BENEFIT	Painted surface looks newer longer
FEATURE	Superior efflorescence resistance
BENEFIT	Keeps salt deposits (white fuzz) from developing
FEATURE	Excellent color retention
BENEFIT	Colors resist fading
FEATURE	Very good grain crack resistance
BENEFIT	Protects new and previously painted wood
FEATURE	"Dead flat" finish
BENEFIT	Minimizes surface imperfections
FEATURE	Easy to apply
BENEFIT	Convenient

	PROPERTIES
Viscosity	105-110 KU
Density	11.40 lbs/gallo
Solids by Weight	56%
Solids by Volume	40%
Spread Rate	300-400 sq. ft. (Spread rate will vary depending on met surface texture and surface porosity)
Specular Gloss	1-2% on a 60
Dry Time at 77"F	To Touch: 1-2 Recoat: 4 -6 ho
Clean-Up	Water
VOC	70 g/L

PROUD USER TESTIMONIALS

"Your New Acri-Flat has great brushability and demonstrates excellent water repellency compared to o
- Greg Brink - President, Vertex Coatings, Inc., Corona, CA

"The New Acri-Flat is easier to apply and has less spatter than original Acri-Flat."
- Lewis Graner, Graner Painting, Casa Grande, AZ

"Switching to New & Improved Acri-Flat made a surfactant-leaching problem on a house with wood sid
- Tom McCaslin, Palmer Painting Company, La Mesa, CA

Learn about other R&D topics

W 411 Suprema's superior scrub resistance
W 401 Decovel & stain resistance
W 708 E-Z Prime & tannin resistance
W 901 Permasheen & block resistanc

Important paint research

Select a topic to learn more about Dunn-Edwards and industry research on key paint issues. Simply do sheets for your reference.

Ethylene Glycol   Factors that Influence Touch-Up   Painting in Hot and Cold

MATERIAL SAFETY DATA SHEET

DUNN-EDWARDS CORPORATION
4885 EAST 52ND PLACE
LOS ANGELES, CA 90040-2828

EMERGENCY TELEPHONE NUMBER:
(800) 733-3866, EXTENSION 2240

INFORMATION TELEPHONE NUMBER:
(323) 771-3330, EXTENSION 2240

DATE OF PREPARATION: 04/01/99

SECTION I - PRODUCT IDENTIFICATION

MSDS FORM #1
GENERIC WATERBORNE LATEX COATINGS
(SEE INDEX FOR PRODUCTS COVERED)

HMIS CODES:	H	F	R	PP
	1	0	0	E

U.S. DOT SHIPPING DESCRIPTION: (Non-Regulated)

SECTION II - HAZARDOUS INGREDIENTS

			ACGIH	OSHA EXPOSURE LIMITS				
			TLV/TWA	TWA		STEL		VAPOR PRESS
INGREDIENT	CAS NUMBER	%WT	PPM	PPM	MG/M^3	PPM	MG/M^3	mmHg @ TEMP
Propylene Glycol	00057-55-6	<5%	-	-	-	-	-	0.1 @ 68°F
Texanol Ester Alcohol	25265-77-4	<5%	-	-	-	-	-	0.1 @ 68°F

SECTION III - PHYSICAL AND CHEMICAL DATA

BOILING RANGE: 200-225°F
SPECIFIC GRAVITY (H_2O=1): 1.4
SOLUBILITY IN WATER: Partly soluble.
EVAPORATION RATE: Slower Than Ether.
VAPOR DENSITY: Heavier Than Air.
VOLATILE VOLUME: 60%
APPEARANCE AND ODOR: Liquid dispersion with mild odor.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLAMMABILITY CLASSIFICATION: N/A
FLASH POINT: N/A LEL: N/A UEL: N/A
EXTINGUISHING MEDIA: Foam, Alcohol Foam, CO_2, Dry Chemical, Water Fog.
UNUSUAL FIRE AND EXPLOSION HAZARDS: Liquid material is non-combustible, but dried films are capable of supporting combustion when in contact with open flames. Closed containers can develop internal pressure and may rupture when subjected to extreme heat.
SPECIAL FIREFIGHTING PROCEDURES: Use self-contained breathing apparatus in confined spaces. Observe recommended procedures for handling ordinary combustible materials.

SECTION V - HEALTH HAZARD DATA

POTENTIAL ROUTES OF ENTRY / SIGNS AND SYMPTOMS OF EXPOSURE
INHALATION: Exposure to high vapor concentration may irritate mucous membranes and respiratory tract. Extreme overexposure may produce dizziness, headache, and nausea.
EYE CONTACT: Direct contact may cause eye irritation, redness, and tearing.
SKIN CONTACT: Prolonged contact may cause transient reddening of the skin.
SKIN ABSORPTION: Available information provides no evidence of adverse effects.
INGESTION: May cause gastrointestinal irritation, nausea, vomiting, and diarrhea.
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Pre-existing eye, skin, and respiratory system disorders, and unusual allergic sensitivity.

CHRONIC OR DELAYED HEALTH HAZARDS: Available information provides no evidence of chronic or delayed health hazards associated with exposure to this product.
CARCINOGENICITY: NTP? NO. IARC MONOGRAPHS? NO. OSHA REGULATED? NO.
EMERGENCY AND FIRST AID PROCEDURES: If affected by inhalation of vapor, move victim to fresh air. If not breathing, apply artificial respiration and call emergency medical care. For eye contact, flush eyes with fresh water for at least 15 minutes. If irritation persists, seek medical attention. For

skin contact, wash thoroughly with soap and water. Remove any contaminated clothing. If swallowed, have victim drink enough fresh water to ensure dilution. Call emergency medical care.

SECTION VI - REACTIVITY DATA

STABILITY: Stable. HAZARDOUS POLYMERIZATION: Will not occur.
HAZARDOUS DECOMPOSITION PRODUCTS: Combustion can produce carbon monoxide and/or carbon dioxide.
CONDITIONS TO AVOID: Avoid storage or use at temperatures below 40°F. Avoid freezing.
INCOMPATIBILITY (MATERIALS TO AVOID): Avoid water-reactive materials, strong oxidizers, acids and alkalis.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING, STORAGE, AND DISPOSAL

PRECAUTIONS FOR HANDLING AND STORAGE: Keep containers closed when not in use. Do not handle or store near heat, flame, or strong oxidizers, acids and alkalis. Store in cool, well-ventilated area. Rotate stock, use older material first. Inspect all containers for leaks.
STEPS TO TAKE IF MATERIAL IS RELEASED OR SPILLED: Dike and absorb spilled liquid with inert material such as clay granules, sand, earth, or sawdust. Use rags to clean up small amounts of spilled material.
WASTE DISPOSAL METHOD: Collect contaminated absorbent material and rags into a suitable container and dispose in accordance with all applicable local, state, and federal regulations.

SECTION VIII - CONTROL MEASURES FOR SAFE USE

RESPIRATORY PROTECTION: For spray application, use particulate filter mask to avoid breathing spray mist. Exposed persons with unusual allergic sensitivity may need organic vapor respirator (NIOSH/MSHA TC 23C or equivalent).
VENTILATION: For interior use, general mechanical ventilation may be sufficient to disperse vapor. Otherwise, open doors and windows or use portable fans to provide local exhaust.
EYE PROTECTION: Use safety glasses, goggles, or face shield to protect eyes.
PROTECTIVE GLOVES: Use waterproof gloves (e.g., latex, vinyl, rubber, neoprene) to avoid skin contact.
OTHER PROTECTIVE CLOTHING OR EQUIPMENT: Waterproof headcovering and general protective clothing are recommended for protection as necessary.
WORK/HYGIENIC PRACTICES: Wash hands and face before eating.

SECTION IX - SPECIAL CAUTIONS

Do not store in areas subject to freezing temperatures. Keep above 40°F at all times. Use only with adequate ventilation or protection. Avoid breathing spray mist or vapor. Do not ingest. Avoid contact with skin. Close container after each use. Keep out of reach of children.

OKON

DECK STAIN

OK-720

PRODUCT DESCRIPTION

OKON DECK STAIN is a water based water repellent and wood stain for horizontal wood applications. OKON DECK STAIN maintains a dry condition by preventing the penetration of moisture into wood, which discourages rotting and mildewing. It also screens out the damaging ultraviolet (UV) rays while enhancing the beauty of the wood's grain and texture. A wide range of semi-transparent colors can be custom mixed using universal coloring systems.

DESIGNED FOR

- Decks
- Milled (smooth) lumber
- Outdoor furniture
- Pressure treated lumber
- Rough lumber
- Shingles

FEATURES

- Easy application
- Fast drying
- Low odor
- Low VOC
- Non-flammable
- Unlimited color selection
- Water clean-up

LIMITATIONS

- Do not use clear.
- Do not attempt to make a semi-solid or a solid stain when tinting OKON DECK STAIN.
- Do not apply OKON DECK STAIN when freezing conditions are anticipated within 24 hours of application.
- Avoid heavy traffic for a minimum of 24 hours.

TINTING

- Add a minimum of 2 oz, or a maximum of 8 oz of colorant per gallon to OKON DECK STAIN. Colorant adds protection against the harmful effects of ultra violet (UV) radiation while enhancing the beauty of wood's grain and texture.

- Always check color on a sample of the substrate to be used prior to applying on finished project.

TECHNICAL DATA

- Chemistry — Modified acrylic emulsion
- Clean-up — Water
- Dry time @ 25°C (77°F) & 50% RH:
  To touch - 2 hours
  Foot traffic - 24 hours
- Flash point — N/A
- Percent solids — 20% minimum by weight
- Product type — Water based

PRODUCT SPECIFICATIONS

PROPERTY	TEST METHOD	RESULTS
pH	ASTM E 70-68	8.0-9.5
Flash Point	ASTM D 93	N/A
Viscosity cps	ASTM E 2196	<100
% Solids/Weight	ASTM D 1353	20.0 minimum
Pounds/Gallon	ASTM D 1475	8.5
Kilograms/Liter	ASTM D 1475	1.02
UV Resistance	QUV 1000 hours	Pass
Breathable	ASTM D 1653-72	Yes
Paintable	ASTM D 3359-90	Yes
VOC's g/L	EPA Method 24	101

columbia
paint & coatings

"Enhances Natural Beauty" WOOD FINISHES
Woodtech Solid Color Pre-Stain
09-870

SUGGESTED USES

Suggested for use over pre-primed fiber cement board, interior and exterior bare wood substrates. **Limitations:** Not recommended for previously painted surfaces. If stain bleed occurs over bare wood, use of a stain-blocking primer will be required.

OUTSTANDING FEATURES

Woodtech Solid Color Pre-Stain is a durable stain that provides excellent protection without obscuring the natural beauty of the wood grain. Excellent color retention, good penetration and recoat properties. Low odor and water clean up. Suitable for application with pre-stain automated applicators.

FINISH/SHEEN

Eggshell

COLORS

Available in a variety of colors and bases. (special order)

DRY/RECOAT TIME

	50° F and above
Dry-to-Touch	20-30 minutes
Dry-to-Recoat	1-2 hours
Dry-to-Stack or Bundle	12-16 hours

Dry times will vary depending upon temperature, humidity and wet film thickness.

VEHICLE

Acrylic Latex

SOLIDS

By Volume: 30-32% / By Weight: 43-45%

VOC

62 grams per liter.

FLASH POINT

>200° F

VISCOSITY

82-86 KU

RECOMMENDED FILM THICKNESS

4.0-5.0 wet mils / 1.2-1.6 dry mils per coat. Application of two coats, at 320-400 sq. ft. per gallon, is recommended for most smooth or slightly textured substrates. Heavily textured or highly porous surfaces may require higher wet mils per coat.

COVERAGE

360 sq. ft. per gallon at recommended film thickness.

SURFACE PREPARATION

The surface to be painted must be clean and dry, free of dust, dirt, mildew, oil or grease. Any loose or scaling material should be removed by wire brushing or sanding. Remove mildew by scrubbing with a commercial mildew cleaner or with a solution of one tablespoon of dry powdered non-phosphate detergent and two quarts of household liquid bleach to two quarts of warm water. After scrubbing, rinse thoroughly with water and allow the surface to dry before painting. **CAUTION**: Do not add ammonia, detergents, or cleaners containing ammonia to the bleach/water mixture. Wear protective glasses and waterproof gloves to avoid eye and skin irritation. **Bare wood:** Sanding may be necessary to remove the hard, shiny surface layer (mill glaze) to improve penetration. Apply this product to a small area to confirm that water-soluble tannin stains do not penetrate through the dry film. Bare wood that has weathered without protection for extended periods will require power washing or sanding to remove loose fibers and restore surface integrity.

THINNING

Not recommended, but may be thinned up to 10% with water if desired.

APPLICATION CONDITIONS

Air, surface and material must be 40 - 90° F. Apply in shade when possible, not in direct sunlight. Do not apply if freezing temperatures or rainfall is expected within 48 hours. Mix thoroughly before and frequently during application. Apply generously up to 400 sq. ft. per gallon. Use brush, roller or spray. This stain should be used on primed fiber cement siding or unpainted wood only and is not recommended over previously painted surfaces. Apply stain uniformly to prevent lap marks. Stain to an opening in the wall or complete the entire side before proceeding to the next section. Pre mix or box all containers to insure uniformity. It is important to maintain frequent mixing during usage. Recoat within 1-2 hours.

PRODUCT APPLICATIONS

(X) Brush / (X) Roller / (X) Conventional Spray .055 / ( ) Dipping
(X) Airless --Tip Size .013-.017 / HVLP .055 / Air Assisted Airless .013-.017

CLEAN UP

Rinse applicators and tools promptly in warm, soapy water.
Water in spray lines should be purged from the system with mineral spirits.

PRIMERS	SUBSTRATE	RECOMMENDED COLUMBIA PRIMER
	Pre-Primed Fiber Cement	Self-Priming
	Bare Wood	Self-Priming (See notes under Surface Preparation.)
	Staining Woods	05-200-PP Masterpiece Acry-Prime Interior/Exterior Primer
CLEANING/ MAINTENANCE OF CURED FILM	Do not wash this coating before fourteen days to permit proper curing. May be washed after two weeks with mild liquid detergent and soft cloth or sponge, then rinse. Abrasive cleanser not recommended.	
STORAGE AND SHELF LIFE	Store in a dry, well-ventilated area. Storage temperatures should be between 40° F and 90° F. DO NOT FREEZE. Shelf Life = 12 months.	

SPECIAL NOTES

All data and information is based on the non-tinted, white base formulation.

IMPORTANT! Color may vary slightly from batch to batch. Check the color and "box" this product on jobsite. Color appearance may vary with texture, lighting, and sheen. Verify color **before** applying. To be sure of getting the desired color effect, make a sample brush-out on a piece of substrate to be used on the job. **STIR WELL BEFORE USING. KEEP FROM FREEZING.**

PRECAUTIONS

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 eye watering, headaches or dizziness is experienced, increase fresh air, or wear respiratory protection (NIOSH/MSHA Approved) or leave the area. When spraying, follow spray equipment manufacturer's recommendations carefully. Wear appropriate respirator, eye protection and protective clothing.

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.

Removal of old paint by sanding, scraping or other means could generate dust or fumes which may contain lead. Exposure to lead dust or fumes may cause adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For additional information, contact the USEPA/Lead Information Hotline at 1-800-424-LEAD.

DO NOT TAKE INTERNALLY
KEEP OUT OF REACH OF CHILDREN

HMIS: HEALTH = 1, FIRE = 0, REACTIVITY = 0
4 = EXTREME, 3 = HIGH, 2 = MODERATE, 1 = SLIGHT, 0 = INSIGNIFICANT, * = CHRONIC

columbia paint & coatings
800-537-8530
www.columbiapaint.com

EPMAR

TECHNICAL BULLETIN

KEMIKO TRANSPARENT STAIN

Water Extended Acrylic Urethane

Description

KEMIKO Transparent Stain is a single component, superior coalescing low viscosity polymer solution formulated with quality color retentive pigments that produce an unlimited variation of color, is ultra-low VOC, has no objectional odor, very user friendly, and cures to a highly adhesive resilient transparent film. This class product is supplied in a full pallette of colors and is acceptable for interior and exterior applications.

Applications

KEMIKO Transparent Stain is applied to properly prepared concrete, plaster, polymer cement, and wood as a stain, wash or faux finish. Typical applications include walkways, decks, commercial and residential floors, hospitals, schools, shopping malls, restaurants, and theme parks. This class product must be topcoated with EPMAR specified clear coats for added UV resistance, abrasion resistance, chemical resistance, and sanitary cleanliness. Excellent replacement product for high VOC alcohol stains and water based acrylic stains, which cures to a hard resilient transparent film with excellent flow properties, and increased washability.

Performance

VOC – <30 g/l - *Meets Final SCAQMD Rule 1113 (2008)*
Stain Resistance (When Topcoated) – *Mustard, Catsup, Soft Drinks, Coffee, Grease & Grime, Fruit Juices, Commercial Cleaners.*
Excellent Workability – *Brush, Roll, Mottling, & Spray Applications*

Manufactured by: EPMAR CORPORATION

Epoxy and Polyurethane Manufacturing and Research
13210 Barton Circle – Santa Fe Springs, California 90670
Tel: (562) 946-8781 **Fax:** (562) 944-9958
E-mail: info@epmarcorp.com

Physical Characteristics

Volume Solids:	15%
Weight Per Gallon:	8.5 lbs.
Packaging:	1s, 5^s, 55^s
FlashPoint:	>200°F.
Colors:	Phthalo Blue, Bright Yellow, Yellow Oxide, Monoazo Red, Red Oxide, Orange, Phthalo Green, Raw Umber, Raw Sienna, Burnt Umber, Burnt Sienna & Violet.
Dry Time:	@70°F. 50% RH, 30-minutes – 1 hour to touch 2-3 hours to Clear Coat. Full cure in 48-hours (washability)
Coverage:	300-400 square feet per gallon – per coat
Thinning:	None required. Use mild soap and tap water for cleanup
Primers:	None Required.Typically used as a transparent stain on bare cement/plaster, polymer cement, and wood
Topcoats:	Kemiko Clear Acrylic Urethane, Sta-Crete 2700 Clear Polyurethane, Sta-Crete 3700 Clear Epoxy. Refer to systems for complete application instructions.

Surface Preparation

Concrete, Plaster, Polymer Cements – Remove all visible oil, grease, sludge, and any other contaminants shall be removed prior to any abrasive surface preparation, acid etching and water washing. Surface shall be cured, dry and free from dark alkali stain and laitance. Blas-Trac or other abrasive preparation is preferred for long term adhesion and non-slip surface.

Wood – Surface must be completely dry, free of any contaminants, mildew and organic matter.

Application Methods

Brush – Use top-quality nylon bristle brush for best film properties.

Mottling – Use clean cloths or sponges for faux finishing, aging and graining.

Roller – Lambswool or similar cover with phenolic core, ¼ - ½ inch nap thickness.

Spray – Commercial conventional air spray or airless spray equipment utilizing spray gun tip size between .013"-.015". Adjust pressure for proper atomization. Hudson and other hand held commercial sprayers could be used to achieve desired results.

Environment – Apply between 50°F. – 100°F. and 5°F. above dewpoint.

Safety – Areas such as pool decks, sloped driveways, or other surfaces subjected to water may become slippery when topcoated with specified products. If you must seal these surfaces, keep the sealer film build-up to a minimum. In severe cases a non-slip material such as fine glass beads, washed silica sand and other aggregates may be broadcasted between coating applications.

Contact EPMAR for any additional application information.

WARRANTY

The following warranty is made in lieu of all other warranties, either expressed or implied. This product is manufactured of selected raw materials by skilled technicians. Neither seller nor manufacturer has any knowledge or control concerning the purchaser's use of this product and no warranty is made as to the results of any use. The only obligation of either seller or manufacturer shall be to replace any quantity of this product, which is proved to be defective. Any claim of defective product must be received in writing within one (1) year from date of shipment. Neither seller nor manufacturer assumes any liability for injury, loss, or damage resulting from use of this product.

FUHR
International, LLC
Specialty Paint &
Wood Coatings

High Quality Water based
Wood Finishes

BEST GRADE

Product Series Number:
105

Wiping Stain

Summer 2002

An extremely low Voc water based stain designed for wood color enhancement and decorative effects before sealing and finishing. Used on any wood surface, 105 is a little to no grain raising acrylic stain base developed to work with all of our series of sealers and finishes as well as most other finish products including lacquer and other solvent based finishes. Compatible with pigments and dyes for an unlimited range of colors. Offered in 18 standard stock colors of both pigment (good for evening out unmatched woods) and dye (best available clarity and warm colors) with custom colors matched upon request. Designed for use when more open time and workability is needed in wiping applications. 105 may be spray applied then wiped from the surface, brushed or simply wiped on. Typical dry time to seal in ambient conditions is 30-45 minutes depending on substrate preparation and amount of stain applied. Product may be force dried with heat and air if proper flash time is allowed

PRODUCT DATA & SPECIFICATIONS

Appearance & Odor:	Color liquid, mild odor	**VOC content by #:**	.125#/gallon
Evaporation Rate:	Slower than ether	**VOC content by G/l:**	15 Grams / liter
Solubility in Water:	Dilutable	**VHAP content:**	0
Specific Gravity:	< 1.00	**VOC % Solids content:**	.004# /solids/gallon
Weight per Gallon:	8.3 #	**Flash Point:**	Non-combustible
Solids by Weight:	1.42 #	**Flammability:**	Not applicable
Solids by Volume:	17.1 %	**Viscosity:**	# 4 Zahn Cup, 25-30 seconds

Substrate Preparation: Substrate should be pre-sanded with 150 grit abrasive or higher. 220 grit abrasive is reccomended for best results. Clean surface of all dust with lint free cloth.
Application: May be applied by spray, brush or wiping. Allow 45 minutes in ambient conditions for drying prior to sealer application.
Cleanup: Flush all equipment with water both before and after use of 105. Build-up may be removed with a cleaner solution such as 330 Universal Cleaner & Stripper. Flushing with water is necessary after the use of any cleaning agent to avoid contamination

Featured Benefits

*** Fast Dry * Extremely Low VOC * Multi-Use * Low Cost * 36 Standard Colors ***
*** Film Forming * Water Clean-Up * No Haps * Non-Flammable * Easy Application ***

1-800-558-7437

Fuhr International, LLC
64664 Woodburn Drive
Winigan, MO 63566

www.fuhrinternational.com

FUHR
International, LLC
Specialty Paint &
Wood Coatings

High Quality Water based
Wood Finishes

Product Number: 5800

ZVOC® EXTERIOR WATERBASED STAIN

Summer 2002

A SOLVENT FREE water based acrylic stain for use on interior & exterior wood substrates. Of the many unique traits this product has to offer, excellent substrate wetting and color control, overall durability, chemical resistance along with water resistance are excellent. Minimal grain raise. The exterior durability allows this product to be used in numerous applications from doors to windows. This product also is designed for the kitchen cabinet industry when used with our ZVOC Finishes. This a great stain for many applications outside the cabinet industry, including but not limited to furniture, molding, passage doors, millwork, wine racks and decks. Typical dry time to touch in ambient conditions is 5 minutes, light handling in 10 minutes and sealer coat in 20 minutes. Sanding between coats of sealer and topcoat with 320 grit (or higher) sandpaper is recommended for maximum quality. Compatible with most finish equipment and normal stain applications to include wiping, dipping, spray and wipe or spray only.

PRODUCT DATA & SPECIFICATIONS

Appearance & Odor:	White liquid, mild odor	**VOC content by #:**	0 #/gallon
Evaporation Rate:	Slower than ether	**VOC content by G/l:**	0 Grams / liter
Solubility in Water:	Complete	**VHAP content:**	0
Specific Gravity:	< 1.01	**VOC % Solids content:**	0 # /solids/gallon
Weight per Gallon:	8.44#	**Flash Point:**	Non-combustible
Solids by Weight:	15.3 %	**Flammability:**	Not applicable
Solids by Volume:	14.3 %	**Viscosity:**	# 2 Zahn Cup, 20—35 seconds

Substrate Preparation: Substrate should be pre-sanded with 150 grit abrasive or higher. 220 grit abrasive is recommended for best results. Clean surface of all dust with lint free cloth.
Application: May be applied by spray, dipping, roll coating or brushing. Allow 15 minutes in ambient conditions for drying prior to sealer application.
Cleanup: Flush all equipment with water both before and after use of 5800. Build-up may be removed with a cleaner solution such as 330 Universal Cleaner & Stripper. Flushing with water is necessary after the use of any cleaning agent to avoid contamination.

Featured Benefits

*** Fast Dry * Zero VOC * Excellent Durability ***
*** Water Clean-Up * No Haps * Easy Application * Meets KCMA ***

1-800-558-7437

Fuhr International, LLC
64664 Woodburn Drive
Winigan, MO 63566

www.fuhrinternational.com

ACRYLASTIC® 490

PRODUCT DATA

PRODUCT DESCRIPTION

ACRYLASTIC 490 was developed in 1983 to be a high-build, decorative, extremely flexible, high performance waterborne waterproof wall coating that provides long-term protection and beauty over a variety of interior and exterior surfaces.

PRODUCT USES

ACRYLASTIC 490 is designed to coat over properly primed interior and exterior concrete, masonry, stucco, most wood and metal substrates. Acrylastic 490 may be top coated with Sunshield 3800 to reduce dirt pick-up. It is especially recommended for use over:

- Cracked, uneven or unsightly surfaces
- Surfaces where water penetration and degradation pose problems
- As an encapsulator coating over asbestos and lead
- Areas where long-term surface protection is desired and continuous repainting costs are prohibitive

PRODUCT ADVANTAGES

- Superior Performance = Superior Value & Life-Cycle Cost
  - Acrylastic 490 offers double the performance of competitors
  - 1 gallon will do what 2 gallons of most other elastomers do
- Superior flexibility and elongation at 1400%
  - Most other elastomers hit 500%
  - Greater protection against new cracks forming
  - Remains very flexible even at low temperatures
- Extremely tough, has highest tensile strength in its class at 2400 p.s.i.
  - Most other elastomers hit only 250 p.s.i.
  - Better resistance to dirt pick-up and tearing
- Superior Resistance to Alkali, Salt and Fungus and Weathering
- Superior adhesion to substrate
  - Resists peeling off
- Superior waterproofing, has very low water vapor transmission
  - Won't allow water in liquid form to pass, yet it will breath
- Easy application with airless, conventional air, roller or brush
- Water-base for easy clean-up and low odor
- High solids therefore low shrinkage, allows it to bridge hair-line cracks

PRODUCT PROPERTIES

Tensile strength, p.s.i. (ASTM D2370, 1 in./min.)	2400
Tensile elongation % at break (ASTM D2370, 1 in./min.)	1400
Low Temperature tensile elongation(0°C)% (ASTM D2370, 1 in./min.)	600
Moisture vapor transmission, perms @ 20 mils DFT (ASTM E96, Proc. B)	1.2
Peel Adhesion, concrete p.s.i. (ASTM D413)	48
Viscosity (Stormer K.U.) (ASTM D562)	125-135
Solids, % minimum by volume (by application)	60
Impact resistance (Fed. Std. 141 [6226])	>60 in-lb
Salt-spray resistance (ASTM D1654)	no rusting
Alkali resistance (Fed. Spec TT-C-555B, GSA ex. 1)	no effect
Fungus resistance (Fed. Std. 141 [6271], note 2)	no growth
Heat Stability (Fed. Std. 141 [6051])	no change
Resistance to wind-driven rain >1000 mph (Fed. Spec TT-C-555B, 4.4.7 min. 95 mph req.)	no wt. gain
Resistance to ponded water	no film degradation
Accelerated weathering @ 5000 hrs. (ASTM D822)	no chalking, no sheen loss, no degradation, no discoloration

Note: All tests performed represent minimum standards. Unless otherwise stated and specified, all samples were spray applied, allowed to air dry for 1 year and tested at 23 °C (73 °F).

PRODUCT LIMITATIONS

- Do not apply Acrylastic 490 when surface temperature is below 45 °F.
- When surface or air temperature exceeds 100 °F., consult Davlin for special application procedures
- Do not apply during, or 24 hours preceding, inclement weather including rain, fog, mist or freezing temperatures.
- Do not apply directly to contaminated, damaged or powdery surfaces.
- Do not apply to any surface previously coated with a silicone water repellent or other type of release or curing agent.
- Do not apply when a vapor barrier is required.
- Do not apply on exterior below-grade surfaces.
- Acrylastic 490 will freeze and become unstable at temperatures below 32 °F. Do not ship or store in any area where freezing may occur.

WATERBORNE ELASTOMERIC WALL COATING

PRODUCT INFORMATION

Finish	Eggshell
Color	White or Custom Colors
Components	1
Curing Mechanism	Air Dry
Volume Solids (% as applied)	60
Coats	1-2
Wet Film Thickness per coat*	16 mils
Dry Film Thickness (DFT) per coat	9.6 mils
Coverage per coat per 100 sq. ft.	1 gallon
Minimum total DFT (5 year system)	8 mils
Minimum total DFT (10 year system)	16 mils
VOC	75 g/l
Flash Point (SETA)	>215°F
Qualifications	Fed. Spec. TT-C-555
Packaging	1, 5, 55 Gal.
Availability	Shipped Nationally & Internationally

APPLICATION SYSTEM

Primer/Sealer	***Butylseal 572***
Base Coat	***Acrylastic 490***
Top Coat (optional)	***Sunshield 3800***

APPLICATION CONDITIONS

- Temperature air and surface: 45°- 100°F, 7°- 38°C
- Do not apply at temperatures below 45°F nor during, or 24 hours preceding, inclement weather: including rain, fog, mist, or freezing temperatures.

SURFACE PREPARATION

- All surfaces shall be clean, free from dirt, release agents, wax, mildew and all other contaminants, including salt deposits. Remove all old loose paint.
- All porous surfaces shall first be primed with Davlin's Butylseal 572 including: new wood, concrete, masonry and slightly chalky substrates. Metal surfaces shall first be primed with a suitable metal primer. Old wood surfaces shall be primed with an oil base primer.
- CRACKS: Prime all cracks with Butylseal 572. For cracks 1/32 inch or less apply Acrylastic 490 and roll in. On larger cracks not exceeding 3/8 inch, fill with Acryflex 1210. On cracks exceeding 3/8 inch, treat as expansion joint using a polyurethane foam backer rod and an expansion joint compound or repair with a masonry patching compound.
- Never feather out caulk. Remove all excess caulking material from around the crack to avoid an uneven appearance after applying Acrylastic 490. Acrylastic 490 will not prevent the appearance or reappearance of cracks due to structural movement at expansion joints, settling or earthquakes.

APPLICATION EQUIPMENT

The following is a guide; suitable equipment from other manufacturers may be used. Changes in pressure and tip size may be needed for proper spray characteristics.

Airless: Standard equipment such as Graco Bulldog Hydra Spray 30 or 45:1 pump with a 0.025 - 0.031 inch fluid tip.

Conventional: Industrial equipment such as Binks 11:1 Saturn pump or equivalent with air control cut-off, a material hose 3/4 inch ID minimum and an air hose 1/2 inch ID and 50-75 p.s.i. air pressure minimum. Heavy mastic spray gun such as Binks 7E2 with 1/4 inch fluid tip or larger and slotted nozzle.

Brush or Roller: Suitable for waterborne coating. Multiple coats may be required to achieve specified DFT. Roller nap will vary according to texture of substrate.

APPLICATION PROCEDURE

- Flush all equipment with water before use.
- Stir Acrylastic 490 thoroughly until uniformly blended. Avoid excessive mixing to prevent air entrapment.
- Do not thin.
- Spray or roll a wet coat in even, parallel passes. Overlap each pass 50 percent to avoid holidays, bare areas and pinholes. If required, follow with a cross roll or spray at right angles to first pass. Use a wet film gauge to check film thickness.
- Drying time to re-coat @70°F (21°C)
  - minimum .... dry through (4 - 8 hours)
  - maximum .... none
- On rough surfaces back roll first coat to ensure that coating is pushed deep into surface. Spray or roll second coat at right angle to first.
- Allow second coat to dry 24 hours and no more than 7 days before testing for dry film thickness by removing samples of the coating for micrometer thickness measurements. Examine and inspect applied coating for pinholing and air entrapment. Repair damaged areas.
- Clean equipment with water or water and detergent immediately after use.

WARRANTY INFORMATION

- Limited warranties are available subject to certain terms and restrictions contact your Davlin representative at (510)848-2863 for warranty information.

* Acrylastic 490 may be applied at higher wet film thicknesses under appropriate conditions. Consult Davlin before doing so.

DAVLIN COATINGS, Inc.
700 Allston Way - PO Box 2308
Berkeley, CA 94702
(510)848-2863 Fax: (510)848-1464

SPECIFICATIONS

DAVLIN
ACRYLASTIC ELASTOMERIC WATERPROOF COATINGS

07140,09960 **ELASTOMERIC WALL COATING**
TYPE WALL SURFACE: CONCRETE, MASONRY, STUCCO
TYPE PRODUCTS: ACRYLASTIC 490

PART 1: GENERAL

1.01 Work Included
A. Work includes application of Davlin Coatings' Acrylastic Elastomeric Wall Coating System over existing concrete, masonry or stucco surface.
B. All parts of the "Wall Specifications" or "General Requirements" and the manufacturer's installation details are pertinent to this specification.

1.02 Work Not Included
A. Any modification to building design or wall mounted equipment and/or accessories not found to be part of this specification.

1.03 System Description
A. A waterborne system comprised of a primer/sealer (Butylseal 572), a high-performance single-component elastomeric coating (Acrylastic 490) and a 100% Acrylic top coat (Sunshield 3800).

1.04 References
A. American Society for Testing and Materials (ASTM)

1.05 Submittals
A. Contractor shall furnish the following documents with bid:
   1. Proposed start date, number of working days, and schedule of planned process across building.
   2. Manufacturer's installation instructions.

1.06 Delivery, Storage, and Handling of Materials
A. Delivery of materials to the work site in unopened packages bearing the manufacturer's labels.
B. All materials shall be stored off ground in dry areas which will protect the materials from freezing. Store all materials atroom temperature to assure proper application.

1.07 Project Conditions/ Davlin Products
A. Do not apply over water-saturated surfaces.
B. Do not apply over surfaces contaminated with materials which can act as release agents.
C. Do not apply during, or 24 hours preceding, inclement weather including rain, fog, mist, dew, or freezing temperatures.
D. Do not apply when surface or air temperature is below 45° F.
E. When surface or air temperature exceeds 110° F. consult Davlin for special application instructions.
F. Do not apply over old coating which is or may become loose.
G. Do not apply over surface which contains bacteria, mold or mildew.

1.08 Safety / Coordination
A. All application, material handling and associated equipment shall conform to and be operated in conformance with OSHA safety requirements.
B. Davlin's Material Safety Data Sheets (MSDS) shall be read, understood and instructions adhered to.

PART 2: PRODUCTS

2.01 Manufacturer
A. Product manufactured or accepted by Davlin Coatings, Inc.

2.02 Materials
A. Primer/Sealer: Davlin Coatings Butylseal 572
B. Elastomeric Coating: Davlin Coatings Acrylastic 490
   1. ASTM D2370 Tensile Strength p.s.i.: 2400
   2. ASTM D2370 Tensile Elongation, % at break: 1400
   3. ASTM E96 Procedure B, Moisture Transmission - perms: 1.2
C. Top Coat: Davlin Coatings Sunshield 3800
D. Caulking: Davlin Coatings Acryflex 1210

PART 3: EXECUTION

3.01 Preparation

A. All concrete or masonry surfaces shall be clean, free from dirt, release agents, wax, mildew and all other foreign substances. Remove contaminants mechanically or by power washing.

B. Any current coating lacking excellent adhesion to existing substrate shall be removed.

C. Any metal surfaces that are not galvanized shall primed with a suitable metal primer

D. Applicator shall protect all property during preparation.

E. Applicator shall clean up all residues resulting from preparatory work.

3.02 Application

A. Prime Coat.

1. Apply Butylseal 572 as the prime coat over all areas to be coated at the approximate rate of 100-300 square feet per gallon. Coverage rate will vary depending surface irregularities and porosity. Apply liberally to the existing wall coating at the saturation rate.
2. Use caution when applying Butylseal 572 so as to avoid contact with surfaces not to be coated including windows, caulking, walkways, etc.
3. Allow to dry before applying first coat of Acrylastic 490. At ambient temperatures this should take 4-8 hours. At temperatures significantly lower and/ or when humidity is much above 60% allow a longer time. If in doubt, allow Butylseal 572 to dry overnight.
4. Dry time is defined as that amount of time required for the coating to form a film to such a degree that when one's thumb is pressed firmly to the coating, none of the coating will adhere to the thumb.

B. Cracks

1. Prime all cracks with Butylseal 572. For cracks 1/32 inch or less apply Acrylastic 490 and roll in. On larger cracks not exceeding ⅜ inch, fill with Acryflex 1210. On cracks exceeding ⅜ inch, treat as expansion joint using a polyurethane foam backer rod and an expansion joint compound or repair with a masonry patching compound. Allow to dry.
2. For structural cracks and expansion joints consult Davlin.

C. Acrylastic 490

1. For a 5 or 10 year system, apply the first coat of Acrylastic 490 at the approximate rate of 100 square feet per gallon to all areas (16 wet mils). Use a wet film gauge to check mil thickness periodically. Allow to dry. Dry film thickness should be no less than 8 mils.
2. For 10 year system apply a second coat of Acrylastic 490 perpendicular to the first at the approximate rate of 100 square feet per gallon (16 wet mils) over all areas to be coated. Use a wet film gauge to check mil thickness periodically. The total DFT of both coats should be no less than 16 mils.. Allow a minimum of 24 hours for this second coat of Acrylastic 490 to dry before applying the Sunshield 3800.
3. Acrylastic 490 is supplied as a single-component coating. Mix cans thoroughly as needed until homogeneous. Avoid excessive agitation to prevent air entrapment and resultant pinholing in film.
4. Acrylastic 490 is supplied as ready-mixed. Do not reduce with water or solvents.
5. Use caution when applying Acrylastic 490 so as to avoid contact with surfaces not to be coated such as windows, sealants and walkways.

D. Sunshield 3800.

1. Apply Sunshield 3800 as the topcoat evenly at a rate of between 250 to 300 square feet per gallon in one coat. Provide a minimum DFT of 2 mils.

3.02 Inspection/Quality Control

A. Certification. The applicator, upon completion of the job, and prior to issuing a warranty by Davlin, shall complete the "Warranty Application" certifying to both building owner representative and Davlin Coatings, Inc. that the Acrylastic 490 coating system (exclusive of Sunshield 3800) has been applied to all surfaces at a minimum combined dry film thickness of 8 mils for a 5 year system or 16 mils for a 10 year system.

B. Upon completion of job, all equipment, tools, coatings, etc. shall be removed from job site. All spillages shall be removed, all broken property repaired, all disconnected property reconnected.

3.04 Cleaning

A. Remove trash and debris. Repair damage. Remove stains from walls and walkways caused by work of this section.

END OF SECTION

ChemRex®
BUILDING TOMORROW TOGETHER®

INDEX FEEDBACK HOME

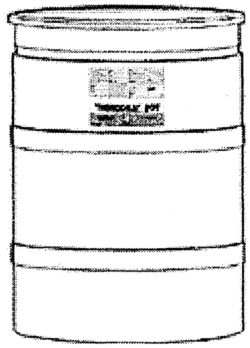
ABOUT THORO | PRODUCT SPECIFIER | NEWS | MESSAGE CENTER

PRODUCT SPECIFIER

Make a selection from one of the menus and click "GO":

GO Select CSI Format...
GO Select Application...
GO Select Product Name...

Thorocoat® DOT



A water-based high-build 100%-fine-textured acrylic coating specially designed for US DOT applications. Apply it vertically and overhead to new or aged concrete as well as previously coated surfaces. Thorocoat® DOT resists wind-driven rain, weathering, and freeze-thaw damage. It provides a durable finish, which resists abrasion and impact. Thorocoat® DOT comes in DOT custom-made colors and in 30-gallon drums only. It is VOC compliant.

Technical Data Guide (PDF/74.6k)
Material Safety Data Sheet (PDF/18.6k)
Guide Specification (DOC/52.7k)

degussa. Construction Chemicals

THOROCOAT® DOT

Water-based high-build 100% acrylic fine-textured coating

Advantages

- Resists wind-driven rain
- Water vapor permeable
- Excellent hiding power
- Resistant to weathering
- Suitable for marine environment
- Resistant to erosion and impact
- Freeze-thaw resistant
- State DOT custom-made colors
- Recoatable
- VOC compliant
- Environmentally friendly

Where to Use Thorocoat® DOT

- DOT concrete structures
- Exterior concrete surfaces
- Vertical and overhead surfaces
- Previously coated surfaces

How to Apply Thorocoat® DOT

Surface Preparation

All surfaces must be sound, clean, and free of all dust, dirt, oils, grease, laitance, efflorescence, mildew, fungus or any biological residues or chemical contaminants that may prevent good adhesion.

Clean the surface by using high-pressure waterblasting, with or without abrasives added to the water stream. The surface should have a texture similar to 100 grit sandpaper when completed.

Some stains and surface contaminants may require chemical removal. When chemical cleaners are used, be sure to neutralize the compounds and fully rinse the surface with clean water. Allow surface to dry before proceeding.

Adhesion should be verified by a test area, if in question. See "For Best Performance" section.

Precast or Cast-In-Place Concrete

New concrete must be cured a minimum of 28 days prior to application of Thorocoat® DOT. In addition to laitance and contaminants, all form release agents or previously applied sealers must also be removed.

Remove all form tie wires and patch holes, small voids and spalls using the appropriate Thoro® concrete repair product. All water ingress into concrete structures should be eliminated before application begins. Check and repair joints or other defects.

Very slick, dense concrete surfaces should be abrasive blasted or primed with Thoro® Primer 2K. To check for proper adhesion, a test area is recommended. See "For Best Performance" section.

Existing Acrylic Coatings

Existing acrylic paint films should be completely cleaned and have all blisters, loose or delaminated areas removed.

Sand or grind the edges of the remaining coating to ensure adhesion and a smooth transition to the new material. Sand the edges of the area to featheredge. Wash down and allow to completely dry.

To check for proper adhesion, a test area is recommended. See "For Best Performance" section.

Chalky surfaces

All chalky surfaces should be treated with Thoro® Primer 2K.

According to ASTM D 4214, Test Method A, a surface is considered chalky if a black cloth, which has been rubbed on the cleaned surface, has a visible residue on it greater than #8. Apply Thoro® Primer 2K if chalk residue rates #6 after water cleaning.

Cracks

Locate and identify all cracks in order to clean, detail and fill them.

For cracks larger than 1/32" (0.8 mm) and up to 1/16" (1.6 mm), use the acrylic-filling Thorolastic® Brush Grade.

For cracks larger than 1/16" by 1/16" (1.6 mm by 1.6 mm) but less than 1/4 " by 1/4 " (6 mm by 6 mm), use the acrylic-filling Thorolastic® Knife Grade.

If using a product other than Thorolastic® Knife Grade or Brush Grade, always apply a test application in a low visibility area to ensure compatibility with patching products.

Cracks larger than 1/4 " by 1/4 " (6 mm by 6 mm) should be treated as standard sealant joints following reputable sealant manufacturer's instructions. Contact ChemRex® Technical Service for recommendations.

Mixing

Mix Thorocoat® DOT at low speed to ensure color uniformity and aggregate disbursement, and minimize air entrapped. Do not thin.

Application

Thorocoat® DOT is designed as a high-build coating. Proper uniform wet film thickness (WFT) must be maintained during application to ensure the performance characteristics desired (see "Coverage" section).

Always work to a wet edge with a 50% overlap. Try to work to a natural break before stopping the application. Keep application methods consistent throughout. Inconsistent application techniques will produce texture and color variations.

Maintain uniform coverage of 14 - 20 mils wet film thickness (WFT) per coat. Avoid heavy applications at 24 to 28 mils wet film thickness (WFT) in one coat, which could cause mud cracking, or color variations.

Brush

Application by brush is recommended only for small inaccessible areas, e.g., on touch-ups. Use a nylon brush only.

Roller

Use a 1/2" (13 mm) nap roller cover (lamb's wool is preferred). Completely saturate the roller and keep it loaded with the coating to build the required mils. Never dry roll. Keep application strokes uniformly vertical or horizontal to ensure color uniformity.

Spray application

Use a heavy duty sprayer designed for the application of coatings which contain sand particles. Ideal tip size is 1/4" to 5/16" with a gun pressure between 30 and 40 psi (0.21 - 0.28 MPa).

Clean up

Clean all tools and equipment immediately with water. Cured material may be removed by mechanical means.

Dry time

At 70°F (21°C) and 50% relative humidity. To touch, 1 to 2 hours. To recoat, 2 to 4 hours. To full cure, 8 hours. Lower surface or air temperature and higher relative humidity can extend dry time.

For Best Performance

- Do not apply when the temperature (substrate or ambient) is 40°F (4°C) or below, or is expected to fall below 40°F (4°C) within 24 hours after application.
- Do not apply if rain is expected within 24 hours of application.
- Do not apply to frozen or frost-covered substrates.
- Not for immersion service.
- Do not apply to horizontal traffic-bearing surfaces.
- Do not apply over moving cracks, for crack filling or crack bridging.
- Do not apply to existing coatings that are not compatible. Perform appropriate adhesion test.
- Apply a 4-ft. by 4-ft. (1.2 m by 1.2 m) test area to verify acceptable color, texture, and adhesion before proceeding with any project. Verify adhesion according to ASTM D 3359, Measuring Adhesion by Tape, Method A. On the 0 to 5 scale, a minimum adhesion rating of 4A is required.
- Do not use solvents, thinners or water to reduce the material
- Transport and store in a dry place away from direct sunlight until ready for use. Keep from freezing temperatures.
- Proper application is the responsibility of the user. Field visits by ChemRex® personnel are for the purpose of making technical recommendations only and are not for supervising or providing quality control on the jobsite.

Technical Data

Liquid Property	Test Method	Result
Weight/gallon, lbs.	ASTM D 1475	13.6
Solids by weight, %	ASTM D 5201	68.7
Solids by volume, %	ASTM D 5201	49.1
Viscosity, KU	ASTM D 562	117 - 125
VOC content, g/L (lbs./gal)	ASTM D 3960	58 (0.48)

Performance Property	Test Method	Result
Accelerated weathering	ASTM G 23, Type D	5,000 hrs., passes
Wind-driven rain	TT-C-555B	Passes
Water vapor permeance	ASTM D 1653	13 perms
Salt spray resistance	ASTM B 117	Passed 300 hours
Adhesion to mineral substrates	ASTM D 3359	Passes
Flexibility	FL DOT Section 400-15.2.6.7g	Passes 1" mandrel
Abrasion resistance	FTMS 141a, Method 6191	Passed at 3,000+
Impact resistance	FTMS 141a, Method 6191	Passed 2.7 m/m
Freeze-thaw resistance	FL DOT Section 400-15.2.6.7a	Passed 50 cycles
Fungus growth resistance	TT-P-29g	Passes
Thermal cycling	ICBO Method modified	Passed 20 cycles

All application and performance values are typical for the material applied in two coats at 16 mils total DFT. Performance values may differ due to variations in the test method, conditions and configurations.

Order Information

Packaging

Thorocoat® DOT

- 5 gallon (18.9 L) pail
- 30 gallon (114 L) drums

Shelf Life

Up to 12 months in unopened, undamaged original sealed containers, which have been properly transported and stored.

Colors

Thorocoat® DOT is available in DOT States required colors.

For further information, please consult your local Thoro® distributor or representative.

Texture

- Fine

Coverage

ChemRex® always recommends applying a test area to determine actual coverage. Apply in an unstretched, uniform manner.

For estimating purposes, Thorocoat® DOT covers between 60 to 80 sq. ft./gal. (1.5 to 2.0 m²/L) per coat when applied on porous substrates and between 80 to 100 sq. ft./gallon (2.0 to 2.5 m²/L) per coat when applied on dense substrates.

Caution

Thorocoat® DOT contains calcium carbonate, titanium dioxide, mica, ethylene glycol, crystalline silica

Risks

May cause skin, eye or respiratory irritation. Ingestion may cause irritation. Repeated ingestion may cause kidney damage.

Precautions

KEEP OUT OF THE REACH OF CHILDREN. Avoid contact with skin, eyes and clothing. DO NOT take internally. Wash thoroughly after handling. Keep container closed when not in use. Use only with adequate ventilation. Use impervious gloves, eye protection and if the TLV is exceeded or used in a poorly ventilated area, use NIOSH/MSHA approved respiratory protection in accordance with applicable federal, state and local regulations. Keep container closed when not in use. All label warnings must be observed until container is commercially cleaned or reconditioned.

First Aid

In case of eye contact, flush thoroughly with water for at least 15 minutes. SEEK MEDICAL ATTENTION. In case of skin contact, wash affected areas with soap and water. If irritation persists, SEEK MEDICAL ATTENTION. If inhalation causes physical discomfort, remove to fresh air. If difficulty persists or any breathing difficulty occurs or if swallowed, SEEK IMMEDIATE MEDICAL ATTENTION.

For more information see Material Safety Data Sheet (MSDS) for this product.

Proposition 65

This product contains material listed by the state of California as known to cause cancer, birth defects or other reproductive harm.

VOC Content

58 g/L or 0.48 lbs/gal, less water and exempt solvents.

For medical emergencies only, call ChemTrec (1/800/424-9300).

Limited Warranty Notice

Every reasonable effort is made to apply ChemRex® exacting standards both in the manufacture of our products and in the information which we issue concerning these products and their use. We warrant our products to be of good quality and will replace or, at our election, refund the purchase price of any products proved defective. Satisfactory results depend not only upon quality products, but also upon many factors beyond our control. Therefore, except for such replacement or refund, CHEMREX® MAKES NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, RESPECTING ITS PRODUCTS, and CHEMREX® shall have no other liability with respect thereto. Any claim regarding product defect must be received in writing within one (1) year from the date of shipment. No claim will be considered without such written notice or after the specified time interval. User shall determine the suitability of the products for the intended use and assume all risks and liability in connection therewith. Any authorized change in the printed recommendations concerning the use of our products must bear the signature of the ChemRex® Technical Manager.

THORO

ChemRex®

Corporate Office:
889 Valley Park Drive; Shakopee, MN 55379

Customer Service: 1/800/433-9517
Technical Services: 1/800/ChemRex (1/800/243-6739)
Web Site: www.chemrex.com

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Replaces 1/01

MATERIAL SAFETY DATA SHEET

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : THOROCOAT DOT
IDENTIFICATION NUMBER: F-060-100
PRODUCT USE/CLASS : Coating

DATE PRINTED: 03/06/00

SUPPLIER:

MANUFACTURER:
ChemRex Inc.
Commercial Construction
Products Division
889 Valley Park Drive
Shakopee, MN 55379

EMERGENCY TELEPHONE:

EMERGENCY TELEPHONE: (800)424-9300
24 HRS A DAY 7 DAYS A WEEK

PREPARER: Scott Shinn, PHONE: 612-496-6000, PREPARE DATE: 03/06/00

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

ITEM	CHEMICAL NAME	CAS NUMBER	WT/WT % LESS THAN
01	ethylene glycol	107-21-1	5.0 %
02	mica	12001-26-2	5.0 %
03	titanium dioxide	13463-67-7	10.0 %
04	Silica, quartz	14808-60-7	25.0 %
05	Calcium carbonate	471-34-1	35.0 %

	EXPOSURE LIMITS					
	ACGIH		OSHA		COMPANY	
ITEM	TLV-TWA	TLV-STEL	PEL-TWA	PEL-CEILING	TLV-TWA	SKIN
01	N.E.	127 mg/m3*	N.E.	125 mg/m3		NO
02	3 mg/m3	N.E.	3 mg/m3	N.E.	N.E.	NO
03	10 mg/m3	N.E.	15 mg/m3	N.E.	N.E.	NO
04	.1 mg/m3	N.E.	.1 mg/m3	N.E.	N.E.	NO
05	10 mg/m3	N.E.	15 mg/m3	N.E.	N.E.	NO

(See Section 16 for abbreviation legend), * - Ceiling Value

SECTION 3 - HAZARDOUS IDENTIFICATION

EFFECTS OF OVEREXPOSURE - EYE CONTACT: Irritating, but will not permanently injure eye tissue.

EFFECTS OF OVEREXPOSURE - SKIN CONTACT: Prolonged or repeated contact can

(Continued on Page 2)

SECTION 3 - HAZARDS IDENTIFICATION

result in defatting and drying of the skin which may result in skin irritation and dermatitis (rash). May cause irritation.

EFFECTS OF OVEREXPOSURE - INHALATION: Headaches, dizziness, nausea, decreased blood pressure, changes in heart rate and cyanosis may result from over-exposure to vapor. May cause respiratory tract irritation.

EFFECTS OF OVEREXPOSURE - INGESTION: Moderately toxic.

EFFECTS OF OVEREXPOSURE - CHRONIC HAZARDS: Chronic overexposure may cause kidney damage. This product contains silicon dioxide [quartz] which has been listed as a suspected human carcinogen by NTP and IARC.

PRIMARY ROUTE(S) OF ENTRY: SKIN CONTACT INHALATION INGESTION EYE CONTACT

SECTION 4 - FIRST AID MEASURES

FIRST AID - EYE CONTACT: Flush eye with water for 15 minutes. Get medical attention.

FIRST AID - SKIN CONTACT: Remove contaminated clothing and shoes. Wash affected area(s) throughly with soap and water. If irritation persist, seek medical attention.

FIRST AID - INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

FIRST AID - INGESTION: If swallowed, DO NOT induce vomiting. Give victim a glass of water or milk. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person. Should vomiting occur, be sure to keep victum's head below hips to avoid aspiration of vomitus into lungs.

SECTION 5 - FIRE FIGHTING MEASURES

FLASH POINT: 232 F

LOWER EXPLOSIVE LIMIT: 3.2 %
UPPER EXPLOSIVE LIMIT: 15.3 %

AUTOIGNITION TEMPERATURE: N.D.

EXTINGUISHING MEDIA: ALCOHOL FOAM CO2 DRY CHEMICAL WATER FOG

UNUSUAL FIRE AND EXPLOSION HAZARDS: Solid stream of water or foam may cause frothing.

SPECIAL FIREFIGHTING PROCEDURES: Containers exposed to fire should be kept cool with water spray. Containers can build up pressure if exposed to heat (fire). As in any fire, wear self-contained breathing apparatus

(Continued on Page 3)

SECTION 5 - FIRE FIGHTING MEASURES

pressure-demand (MSHA/NIOSH approved or equivalent) and full protective gear.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Ventilate the area. Evacuate unneccessary personnel. Large spills should be handled carefully. Put on respiratory protection and necessary personal protective equipment. Dike or impound spilled liquid. Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container. Repeat sorbent/sweep cycle until the spill has dried up. Avoid runoff into storm sewers and ditches which lead to waterways.

SECTION 7 - HANDLING AND STORAGE

HANDLING: Use only in a well ventilated area. Keep out of reach of children. If user operations generate dust, fume, or mist, use ventilation to keep exposure to airborne contaminents below the exposure limit.

STORAGE: Keep container closed when not in use.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Local exhaust ventilation may be necessary to control any air contaminants to within their TLVs during the use of this product.

RESPIRATORY PROTECTION: Wear NIOSH/MSHA approved respiratory protection when the product is mixed or applied in a poorly ventilated area or if workplace levels of ingredients exceed the TLV. Follow applicable federal, state, and local regulations.

OTHER PROTECTIVE EQUIPMENT: Where contact is likely, wear chemical resistant gloves, chemical safety goggles with a face sheild, and clean protective clothing to cover arms and legs to keep exposure to a minimum.

HYGIENIC PRACTICES: Do not take internally. Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Avoid breathing vapors from heated material.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

BOILING RANGE	: 379 - 401 F	VAPOR DENSITY	: Is heavier than air
ODOR	: Slight Sweet	ODOR THRESHOLD	: N.D.

(Continued on Page 4)

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE	: Liquid	EVAPORATION RATE:	Is slower than Butyl Acetate
SOLUBILITY IN H2O	: Dilutable		
FREEZE POINT	: N.D.	SPECIFIC GRAVITY:	1.6000
VAPOR PRESSURE	: N.D.	pH @ 0.0 %	: N.D.
PHYSICAL STATE	: Liquid	VISCOSITY	: N.D.

COEFFICIENT OF WATER/OIL DISTRIBUTION: N.D.

(See Section 16 for abbreviation legend)

SECTION 10 - STABILITY AND REACTIVITY

CONDITIONS TO AVOID: Long term exposure to elevated temperatures.

INCOMPATIBILITY: Avoid contact with oxidizing material.

HAZARDOUS DECOMPOSITION PRODUCTS: Acrid fumes. Oxides of carbon.

HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.

STABILITY: This product is stable under normal storage conditions.

SECTION 11 - TOXICOLOGICAL PROPERTIES

PRODUCT DERMAL LD50: No Information PRODUCT ORAL LD50: No Information
PRODUCT LC50: No Information

COMPONENT TOXICOLOGICAL INFORMATION:

---- CHEMICAL NAME ----	-- DERMAL LD50 --	--- ORAL LD50 ---	---- LC50 ----
ethylene glycol	9530 uL/kg	4700 mg/kg	10876 mg/kg
mica	No Information	No Information	No Information
titanium dioxide	No Information	> 7500 mg/kg	No Information
Silica, quartz	No Information	No Information	No Information
Calcium carbonate	No Information	6450 mg/kg	No Information

SECTION 12 - ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION: No Information.

SECTION 13 - DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Review all local, state, and federal regulations concerning health and pollution for appropriate disposal procedures.

(Continued on Page 5)

SECTION 14 - TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME: Not Regulated

DOT TECHNICAL NAME: N.A.

DOT HAZARD CLASS: N.A. HAZARD SUBCLASS: N.A.

DOT UN/NA NUMBER: N.A. PACKING GROUP: N.A. RESP. GUIDE PAGE:

DOT PLACARD AT: N.A.

DOT CLASS NUMBER: N.A.

UN PROPER SHIPPING NAME: Not Regulated

UN HAZARD CLASS: N.A.

UN CLASS NUMBER: AIR N.A. MARINE N.A.

HAZARD SUBCLASS: AIR N.A. MARINE N.A.

UN UN/NA NUMBER: N.A. UN PACKING GROUP: AIR N.A. MARINE N.A.

UN PLACARD AT: N.A.

SECTION 15 - REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS: AS FOLLOWS -

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200)

CERCLA - SARA HAZARD CATEGORY:
This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD CHRONIC HEALTH HAZARD

SARA SECTION 313:
This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

----------- CHEMICAL NAME -----------	CAS NUMBER	WT/WT % IS LESS THAN
ethylene glycol	107-21-1	5.0 %

TOXIC SUBSTANCES CONTROL ACT:

(Continued on Page 6)

SECTION 15 - REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT:
This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

----------- CHEMICAL NAME -----------	CAS NUMBER
None known.	

U.S. STATE REGULATIONS: AS FOLLOWS -

CALIFORNIA PROPOSITION 65:
WARNING: The chemical(s) noted below and contained in this product, are known to the state of California to cause cancer, birth defects or other reproductive harm:

----------- CHEMICAL NAME -----------	CAS NUMBER
dioxane	123-91-1
Silica, quartz	14808-60-7
Formaldehyde	50-00-0
inorganic lead	7439-92-1
nickel	7440-02-0
Arsenic	7440-38-2
Cadmium	7440-43-9
ethylene oxide	75-21-8

INTERNATIONAL REGULATIONS: AS FOLLOWS -

This product contains material not included on the Canadian Domestic Substance List (DSL).

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

HMIS RATINGS - HEALTH: 1 FLAMMABILITY: 1 REACTIVITY: 0
PERSONAL PROTECTION: B

PREVIOUS MSDS REVISION DATE: 09/13/99

REASON FOR REVISION: General overview

VOLATILE ORGANIC COMPOUNDS (VOCS): 0.48 lbs/gal, 58 grams/ltr

LEGEND: N.A. - Not Applicable, N.E. - Not Established,
N.D. - Not Determined

(Continued on Page 7)

DISCLAIMER

This information is furnished without warranty, representation, or license of any kind, except that this information is accurate to the best of ChemRex's knowledge, or is obtained from sources believed by ChemRex to be accurate. No warranty is expressed or implied regarding the accuracy of this information or the results to be obtained from its use thereof. Chemrex assumes no responsibility for injuries proximately caused by use of the Material if reasonable safety procedures are not followed as stipulated in this Data Sheet. Additionally, ChemRex assumes no responsibility for injuries proximately caused by abnormal use of the Material even if reasonable safety procedures are followed. Buyer assumes the risk in its use of the Material.

<END OF MSDS>

EVERCOAT 7000S
HIGH MODULUS WATERPROOF COATING

DESCRIPTION

EVERCOAT 7000S is the next generation in acrylic elastomeric wall coatings. Its Elongation and tensile strengths eclipse traditional water based systems providing unsurpassed resistance to damage from substrate movement and the elements.

EVERCOAT 7000S is a single component, high build, water based material excellent for waterproofing a variety of masonry surfaces, even if they are badly cracked.

EVERCOAT 7000S is very flexible, it will not only bridge existing cracks during typical building movement, but can prevent the appearance of new cracks as well.

EVERCOAT 7000S can "breathe" allowing water vapor already trapped in the wall to escape. Trapped moisture can cause blistering and peeling in other coatings.

FEATURES

- **Rohm and Haas** Acrylic Technology
- **Durability** - Excellent resistance to the elements and U.V. degradation.
- **Color Retention**- Only colorfast, alkali resistant pigments are used.
- **Flexibility** - Crack bridging and impact resistance even at very low temperatures
- **Adhesion**-Good alkali resistance & excellent adhesion to cement & mortar type surfaces.
- **Dirt pick up**- Several innovative tech-nologies combine to resist the accumulation of dirt on the coating surface and discoloring of a finish.
- **Longevity**- will retard the carbonation of concrete, extending the life of the building.
- **Mildew Resistant** - Superior mold and mildew resistance.
- **Environment Friendly** Waterbased, low VOC. Asbestos, lead, and mercury free.

USES

Waterproof aged, new, and previously painted above-grade masonry, concrete, concrete block and stucco. May also be used on properly prepared wood and metal.

Conceal and protect irregularities in an otherwise sound surface, including repairs, small cracks, crazing, porosity, and small voids.

Repair active cracks in conjunction with Evercoat 702, a high strength polyester reinforcing fabric. This combination gives a fast, effective, less expensive repair that is less obvious than other systems for active cracks. Flashings and joints can also be sealed this way if caulking is not practical.

Beautify any building with a low sheen finish available in many fade resistant colors.

SPECIFICATION DATA

Solids by Weight **70 $\pm$ 1%**

Solids by Volume **60 $\pm$ 2%**

Viscosity (KU) **125 - 135**

Weight(lb/gal) **11.0**

VOC (Calculated g/L) **69**

Elongation (D412) **437%**

Tensile (D412) **601psi**

Water Vapor Permeability **6**

Low Temp Flex(1/2" mandrel) **-30°F**

Wind-Driven Rain (TT-C-555B) **PASS**

Theoretical Yield (mils/gal/100sq.ft) **8.0**

Dry time (@ 77° F and 50% Humidity)

Touch **3 hrs**

Recoat **12 - 24 hrs**

COVERAGE

For optimum crack bridging and waterproofing EVERCOAT 7000S should be applied in two coats to achieve a final film thickness of 18 mils for masonry and 28 mils for wood.

Coverage varies depending on porosity and roughness of surface.

Surface	Typical	Coat	Sq. Ft. / gal
Porous	Stucco, Concrete Block, Wood sheet products	1st 2nd	50-60 60-70
Smooth	Smooth Concrete, Previously painted	1st 2nd	80-90 90-100

SURFACE PREPARATION

All surfaces must be sound, clean, dry, and free of any contamination that would inhibit adhesion. After preparation, always ensure that all residues of cleaners, dust, and powdered masonry are removed and the surface is dry.

MILDEW
Wash mildewed surfaces with a solution of 16 fl. oz liquid household bleach and 2 fl. oz liquid detergent per gallon of water.

EFFLORESCENCE
Can be removed using a wire brush or a 10% solution of muratic acid.

DIRT OR OILS
High pressure water washing(2000psi min) with soap and water is effective.

CHALK, HEAVY RESIDUES
Use high pressure water washing (2000psi min) or light abrasive blasting.

PEELING, LOOSE OR OXIDIZED PAINT
Abrasive blasting or chemical etching should be used.

CRACK REPAIR

Cracks need to be repaired for coating. Normal surface preparation should be completed on the cracks before repair. The repair method used varies depending on crack size.

♦ **HAIRLINE SURFACE CRACKS**
These are from surface stress and can be coated with EVERCOAT 7000S.

♦ **UP TO 1/32 INCH CRACKS**
These cracks should be brushed with EVERCOAT 7000S until the crack surface is uniform. Repeat the process after 4 hours if shrinkage or seepage into the crack has occurred.

♦ **UP TO 1/16 INCH CRACKS**
Fill the crack with an Everest approved 100% acrylic caulk. Force the sealant into the crack as far as possible using a brush, putty knife, or trowel. Leave the caulk surface raised so that a smooth finish will be obtained after shrinkage.

♦ **UP TO 3/8 INCH CRACKS**
These should be repaired using EVERCOAT 701 polyester fabric 3" rolls. Brush apply 20 wet mils of EVERCOAT 7000S 1.5" - 2" on either side of the crack. With coating still wet, embed the fabric lengthwise over the crack into the coating. Smooth out the fabric, removing air bubbles and creases. Feather edges, immediately apply a heavy coat of EVERCOAT 7000S (20 mils minimum), and feather edges a further 2 inches beyond the fabric to hide the patch.

♦ **JOINTS**
Joints can be treated as above, as long as 40% of the fabric width is on either side of the opening and a depression in the fabric is made equal to 25% of the joint width. Joints over 1/16" may be caulked with an Everest approved sealant with a foam backer rod then treated as above.

EQUIPMENT

EVERCOAT 7000S can be applied by spray or roller and by brush (for small areas).

Brush: Use a high quality nylon or nylon-polyester brush; use light strokes to get necessary film thickness. Avoid over brushing which causes air bubbles.

Roller: Use a high quality, quick-release, synthetic roller cover with a 1-1.5" nap. Work in sections 4 foot wide and maintain a wet edge. Once sufficient coating is applied, roll away from coated areas with light downward strokes. Avoid rapid rolling which causes air bubbles.

Airless Spray: Use a pump capable of a flow rate of 1 GPM or more. Use 0.035" to 0.039" orifice tips.

APPLICATION

Plywood/OSB
Normally will not require a primer. Before coating the wall prepare joints with 3 inch Evercoat 701 polyester seam tape (see section on treatment of joints). Once coating of joints has cured, coat whole wall to achieve 28 dry mils in two coats. (approximately 1 ¾ gallons each coat)

New Masonry
Should be cured for at least 30 days. Some substrates such as tilt-up concrete or other highly alkaline surfaces must be coated with an Everest approved alkali resistant primer. See your Everest representative for recommendations.

Porous or Rough Surfaces
These surfaces, such as uncoated concrete block, need back rolling within four to five minutes of spraying to minimize pinholes. If substrate is very porous the first coat can be thinned with up to a quart of water per 5 gallons.

Uncoated Stucco
Stucco must be cured for at least 30 days. Stucco should not be badly cracked or flaking, and should be fully adhered to the substrate. If it is very porous the first coat should be thinned.

CLEAN UP

Can be cleaned up with soap and warm water.

THINNING

Do not thin product unless applying as first coat to a very porous substrate. Thinning will reduce final film thickness and compromise performance. If necessary, thin with up to one quart of water per five gallons of product.

TECHNICAL SUPPORT

Call the Everest Technical hot-line for specific recommendations regarding your project. Toll free at 1(888) ECI-COAT

PRECAUTIONS

Stir product at slow speed before use. It is very important to avoid entrapment of air while mixing. Air entrapment will compromise product performance

Do not apply when ambient temperature is below or is forecast to be below 50^0F. Cold temperatures and high humidity will retard drying.

Store in tightly closed containers and protect from freezing and excessive heat.

New masonry must be cured for at least 28 days before application.

With mastic paints, an experienced applicator is required for a uniform finish. Finish will be affected by application pattern, film thickness, porosity, and climatic conditions. The manufacturer cannot assume responsibility for the finished appearance.

Do not use below grade or where moisture can migrate behind coating.

Do not apply any coatings over EVERCOAT 7000S as elastomeric properties will be compromised and crazing may occur.

EVERCOAT 7000S coatings are not intended for use as a vapor and/or a fire barrier. Do not use for these purposes.

1/2000

EVEREST
COATINGS INCORPORATED

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

EVERCOAT 7000

MSDS Date : 07/30/99

COMPANY IDENTIFICATION

Everest Coatings
P.O. Box 394
Spring , TX 77383-0394

EMERGENCY TELEPHONE NUMBERS

HEALTH EMERGENCY	: 281-350-9800
SPILL EMERGENCY	: 281-350-9800
CHEMTREC	: 800-424-9300

2. COMPOSITION/INFORMATION ON INGREDIENTS.

No		CAS REG NO	WEIGHT (%)
1	Acrylic polymer	Not Hazardous	< 45 - 55
2	Titanium Dioxide	13463-67-7	<10.0
3	Calcium Carbonate	1317-65-3	<40.0
4	Hydrated Alumina	21645-51-2	<10.0%
5	Zinc Oxide	1314-13-2	<5.0%
6	Ammonia	7664-41-7	0.2 MAX.
7	Water	7732-18-5	54-56
8	Ethylene Glycol	107-21-1	<2.0%

See Section 8, Exposure Controls / Personal Protection

3. HAZARDS IDENTIFICATION

Primary Routes of Exposure

Inhalation
Skin Contact
Eye Contact

Inhalation

Inhalation of vapor or mist can cause the following:
- headache - nausea - irritation of nose, throat, and lungs

Eye Contact

Direct contact with material can cause the following:
- slight irritation

Skin Contact

Prolonged or repeated skin contact can cause the following:
- slight skin irritation

4. FIRST AID MEASURES

Inhalation

Move subject to fresh air.

Eye Contact

Flush eyes with a large amount of water for at least 15 minutes. Consult a physician if irritation persists.

Skin Contact

Wash affected skin areas thoroughly with soap and water. Consult a physician if irritation persists.

Ingestion

If swallowed, give 2 glasses of water to drink. Consult a physician. Never give anything by mouth to an unconscious person.

5. FIRE FIGHTING MEASURES

Flash Point	Noncombustible
Auto-ignition Temperature	Not Applicable
Lower Explosive Limit	Not Applicable
Upper Explosive Limit	Not Applicable

Unusual Hazards

Material can splatter above 100°C/212°F. Polymer film can burn.

Extinguishing Agents

Use extinguishing media appropriate for surrounding fire.

Personal Protective Equipment

As in any fire wear self-contained breathing apparatus (pressure-demand MSHA/NIOSH approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Protection

Appropriate protective equipment must be worn when handling a spill of this material. See Section 8, EXPOSURE CONTROLS/PERSONAL PROTECTION for recommendations. If exposed to material during clean-up operations, see Section 4, FIRST AID MEASURES for actions to follow.

Procedures

Keep spectators away. Floor may be slippery; use care to avoid falling. Contain spills immediately with inert materials (e.g. sand, earth). Transfer liquids and solid diking material to separate suitable containers for recovery or disposal.
CAUTION: Keep spills and cleaning runoff out of municipal sewers and open bodies of water.

7. HANDLING AND STORAGE

Storage Conditions

Keep from freezing; material may coagulate. The minimum recommended storage temperature for this material is 1°C/34°F. The maximum recommended storage temperature for this material is 49°C/120°F.

Handling Procedures

Mists can form when material is sprayed. See Section 8, EXPOSURE CONTROLS/PERSONAL PROTECTION for types of ventilation required.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limit Information

No		CAS REG NO	WEIGHT (%)
1	Acrylic polymer	Not Hazardous	40-45
2	Titanium Dioxide	13463-67-7	<10.0
3	Calcium Carbonate	1317-65-3	<40.0
4	Hydrated Alumina	21645-51-2	<10.0%
5	Zinc Oxide	1314-13-2	<5.0%
6	Ammonia	7664-41-7	0.2 MAX.
7	Water	7732-18-5	54-56
8	Ethylene Glycol	107-21-1	<2.0%

Comp.		OSHA			ACGIH	
No.	Units	TWA	PEL	STEL	TWA	STEL
1		None		None	None	None
2	mg/m^3	15		None	10b	None
3	mg/m^3	5a		None	10b	None
4	mg/m^3	5a		None	10b	None
5	mg/m^3	5a		None	10b	None
6	Ppm	None		35	25	35
7		None		None	None	None
8	mg/m^3	None		None	None	None

Respiratory Protection

None required if airborne concentrations are maintained below the TWA/TLV's listed in Section 8, EXPOSURE CONTROLS/PERSONAL PROTECTION. For airborne concentrations up to 10 times the TWA/TLV's listed in Section 8, EXPOSURE CONTROLS/PERSONAL PROTECTION wear a MSHA/NIOSH approved (or equivalent) half-mask, air-purifying respirator. Air-purifying respirators should be equipped with organic vapor cartridges.

Eye Protection

Use chemical splash goggles (ANSI Z87.1 or approved equivalent).

Hand Protection

The glove(s) listed below may provide protection against permeation. Gloves of other chemically resistant materials may not provide adequate protection:
- Neoprene

Engineering Controls (Ventilation)

Use local exhaust ventilation with a minimum capture velocity of 100 ft/min. (30 m/min.) at the point of vapor evolution. Refer to the current edition of Industrial Ventilation: A Manual of Recommended Practice published by the American Conference of Governmental Industrial Hygienists for information on the design, installation, use, and maintenance of exhaust systems.

Other Protective Equipment

Facilities storing or utilizing this material should be equipped with an eyewash facility.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Milky
Color	White
State	Liquid
Odor Characteristic	Ammonia odor
pH	9.0-9.8
Viscosity	10,000 CPS Minimum
Specific Gravity (Water = 1)	1.3-1.5
Vapor Density (Air = 1)	< 1 Water
Vapor Pressure	17 mm Hg @20°C/68°F Water
Melting Point	0°C/32°F Water
Boiling Point	100°C/212°F Water
Solubility in Water	Dilutable
Percent Volatility	30-40 % Water
Evaporation Rate (BAc = 1)	< 1 Water

See Section 5, Fire Fighting Measures

10. STABILITY AND REACTIVITY

Instability

This material is considered stable. However, avoid temperatures above 177°C/350°F, the onset of polymer decomposition. Thermal decomposition is dependent on time and temperature.

Hazardous Decomposition Products

Thermal decomposition may yield acrylic monomers.

Hazardous Polymerization

Product will not undergo polymerization.

Incompatibility

There are no known materials which are incompatible with this product.

11. TOXICOLOGICAL INFORMATION

Acute Data

No Toxicity data are available for this material

The information shown in Section 3, HAZARDS INDENTIFICATION is based on the toxicity profiles for similar materials or components present in this material.

12. ECOLOGICAL INFORMATION

No Applicable Data

13. DISPOSAL CONSIDERATIONS

Procedure

Coagulate the emulsion by the stepwise addition of ferric chloride and lime. Remove the clear supernatant and flush to a chemical sewer. Incinerate liquid and contaminated solids in accordance with local, state, and federal regulations.

14. TRANSPORT INFORMATION

US DOT Hazard Class .... NONREGULATED

15. REGULATORY INFORMATION

Workplace Classification

This product is considered hazardous under the OSHA Hazard Communication Standard (29CFR 1910.1200).

This product is a 'controlled product' under the Canadian Workplace Hazardous Materials Information System (WHMIS).

SARA TITLE 3: Section 311/312 Categorizations (40CFR 370)

This product is a hazardous chemical under 29CFR 1910.1200, and is catagorised as an immediate and delayed health hazard

SARA TITLE 3: Section 313 Information (40CFR 372)

This product contains Ethylene Glycol which is listed in Section 313.

CERCLA Information (40CFR 302.4)

Releases of this material to air, land, or water are not reportable to the National Response Center under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or to state and local emergency planning committees under the Superfund Amendments and Reauthorization Act (SARA) Title III Section 304.

Waste Classification

When this product becomes a waste, it is classified as a non-hazardous waste under criteria of the Resource Conservation and Recovery Act (40 CFR 261).

United States

All components of this product are listed or are excluded from listing on the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

16. OTHER INFORMATION

Everest Coatings Hazard Rating		Scale
Toxicity	1	4=EXTREME
Fire	0	3=HIGH
Reactivity	0	2=MODERATE
Special	-	1=SLIGHT
		0=INSIGNIFICANT

Ratings are based on Everest Coatings guidelines, and are intended for internal use.

ABBREVIATIONS:

- ACGIH = American Conference of Governmental Industrial Hygienists
- OSHA = Occupational Safety and Health Administration
- TLV = Threshold Limit Value
- PEL = Permissible Exposure Limit
- TWA = Time Weighted Average
- STEL = Short-Term Exposure Limit
- Bac = Butyl acetate

GE Sealants & Adhesives

Product Name:
VIP1550 CONCENTRATED WATER REPELLENT (VIP1550)

Product Description

VIP1550 Concentrated Water Repellent is a high performance, breathable, clear, low VOC, water repellent sealer that penetrates deeply into concrete and masonry surfaces to form a tenacious chemical and physical bond without altering the natural appearance of the substrate.

Prominent Features: Supplied in a 50% concentrate* which is easily diluted with water · Effective in the reduction of chloride-ion (de-icing salts) penetration to minimize corrosion potential in steel reinforced concrete · Provides excellent water repellency to reduce cracking, spalling, freeze/thaw damage, chemical degradation, biological growth, efflorescence and dirt pickup · Very permeable, providing resistance to cracking and blistering · 6 month "pot life" after concentrate is mixed with water · No obnoxious odor · Non-flammable · Low VOC content.
· Goes on white, dries clear · U.V. Stable and not biodegradable · Does not change substrate appearance · Good performance on both neutral and highly alkaline surfaces · Soap and water clean up · Meets the standards of acceptability for concrete sealers established in NCHRP Report #244.

Basic Uses

Uses: Can be used for forming an invisible water repellent barrier to protect a variety of horizontal substrates such as concrete driveways, walkways, brick paver and patio deck steps, and vertical masonry surfaces including but not limited to natural and synthetic stone, tilt up concrete, brick, clay tile, stucco and block.

Technical Data

Property	Value	Test Method
% Solids by Weight	50% Minimum	Lab Value
% Solids by Volume	47.1% Minimum	Lab Value
Viscosity:in seconds at 77°F (25°C)	9	Ford 4 Cup

Typical product data values should not be used as specifications. Assistance is available by contacting GE Sealants & Adhesives at 1-800-228-5537.

Limitations

- Structures and substrates vary, consequently, it is important to test a small area prior to application to assure that the desired results and approximate coverage rates are determined.
- Not recommended for below grade application.
- Never apply material to any previously treated, stained or painted surface before conducting a test application to ensure compatibility. Spray water on the surface to be treated; if surface rapidly absorbs the water, then the surface is ready to be treated. If the water beads up, it may have been previously coated.
- Do not apply when temperature of surface or air is below 50°F (10°C).
- Do not apply sealer when temperatures are expected to fall below 40°F (4.4°C) within 4 hours of completed application.
- Do not apply if rain or threatening weather is expected within 24 hours.
- Never apply to frozen or frost covered substrates.
- Avoid spraying in strong wind conditions.
- Under normal circumstances, overspray will not affect most glass, metal, vinyl or painted surfaces. Remove shortly after with household cleaners.
- Not for food contact surfaces.
- Not recommended for wood.
- New concrete must be allowed to cure 3-7 days, depending on weather conditions before applying VIP1550.

Surface Preparation

All surfaces must be sound and free of dust/dirt, laitance, oil, grease, efflorescence, mildew, chemical films, loose paint and any other contaminants. Unsound masonry must be wire brushed or blasted for a firm surface. Dirt, loose contaminants and chalk can be removed by high pressure chemical and water blasting. Other cleaning methods which are compatible with the application of VIP1550 Concentrated Water Repellent include: abrasive blasting (sand, baking soda, vacuum), acid etching, stripping, solvent de-greasing, caustic soda scrubbing, alkaline soap scrubbing, and high pressure water washing with sand. Note: If strongly or caustic cleaning agents are used, neutralize the surface and completely wash residues away.

Re-point any loose or disintegrated mortar and allow 72 hours drying time before application.

Caulking and Patching work must be done prior to application, allowing 6 to 12 hours to cure (or until set).

Method of Application

Mixing Instructions: In a suitably sized clean mixing vessel, add water first (tap water is acceptable), then add the appropriate amount of VIP1550 Concentrated Water Repellent and stir mixture thoroughly prior to and periodically during application. Use a barrel stirring attachment on a power drill or a recirculating pump for mixing.

VERTICAL APPLICATION: Best results are achieved by using a wet-on-wet method of application. This means that during application the penetrant is applied twice in a cross hatch pattern. This insures maximum penetration and surface protection. Apply material in an overlapping pattern to minimize streaks and drips.

Apply from the bottom and work upwards, using low-pressure, non-atomizing spray. A 6 to 9 inch run-down (20 to 30 cm) during application is typical below the application spray point. It is more difficult to saturate the vertical surface evenly when using brushes or lambswool applicators. Any penetrant not absorbed in 3 to 4 minutes should be wiped dry.

HORIZONTAL APPLICATION: Apply appropriately diluted VIP1550 Concentrated Water Repellent mixture in a single wet-on-wet, cross hatch pattern. Any penetrant not absorbed in 3 to 5 minutes should be broomed out or wiped off. Do not allow puddles to dry on surface.

Note: A) For normal chloride ion intrusion protection on horizontal surfaces dilute one (1) part of VIP1550 with one (1) part water. B) For heavy duty uses, where frequent exposure to frost, deicing salts, etc., apply VIP1550 as supplied. C) Coverage should not exceed 200 square feet per gallon ($5m^2/L$).

Curing Information: Once the diluted concentration of VIP1550 Concentrated Water Repellent is applied to a mineral surface, the extremely fine particles penetrate the substrate, and the hydrophilic component reacts chemically with the surface to which it has been applied. Note: it is effective "crosslinking" with the substrate which changes the chemical nature of the water soluble molecules, converting them slowly over a period of a few days to a water insoluble matrix. This produces the water-repellent surface, and yet still permits water vapor to pass and allows the surface to remain breathable. Protect the surface from water and rain for 6 to 8 hours minimum. Product achieves partial cure in approximately 72 hours and full cure in approximately 7 days, depending upon the relative humidity. Treated surfaces may be put into operation (foot traffic) in 12 to 14 hours in most cases (surface should be evenly light in color), indicating that the water has evaporated. Water beading will increase as cure time continues, maximum effects will occur after the seven (7) day cure time. It is important to understand that the ultimate water repellency of VIP1550 is based solely on the porosity of the substrate and the length of time required for the organic constituents of the material to align themselves to form a hydrophobic (non-water loving) zone on the masonry surface.

Do not apply sealants or coatings over surfaces coated with VIP1550 without testing for compatibility and adhesion.

Equipment:

Low-pressure, non-atomizing spray is usually preferred but saturated brush, roller or lambswool application is typically used on some surfaces.

Recommended Spread Rate & Coverage:

Coverage rate is dependent upon the porosity and type of substrate which needs to be treated. Dilution: Refer to Application Guidelines table for normal dilution ratios based on substrate to be treated. Note: these dilution and coverage rates have been established to Federal Specification SS-W-110C performance.

APPLICATION GUIDELINES: Substrate:	DILUTION RATIO (By Volume): Parts VIP1550	Parts Water	COVERAGE RATE: Sq. Ft. Gallon	M^2/L	CALCULATIONS: (Lab Values) % N.V. Wt. Active	% N.V. Wt. Active	Approx. Dry Thickness/Mil	VOC g/L
Slate	1	0.4	450	11	29.2	27.7	0.98	178.2
Dense Brick	1	1	350	8.5	20.7	19.4	0.88	178.2
Exposed Aggregate Concrete	1	1	325	8	20.7	19.4	0.96	178.2
Porous Brick	1	3	150	3.7	10.4	29.7	1.03	178.2
Split Face Block	1	4	125	3	8.3	7.7	0.98	178.2
Stucco	1	4	125	3	8.3	7.7	0.98	178.2
Sandstone	1	4	125	3	8.3	7.7	0.98	178.2
Architectural Concrete	1	7	80	2	5.2	4.8	0.96	178.2
Concrete Block	1	7	80	2	5.2	4.8	0.96	178.2
Clay Tile	1	7.5	75	1.8	5.0	4.6	0.98	178.2
Concrete Pavers	1	14	40	1	2.75	2.6	1.04	178.2

*Material: As supplied (Concentrated). These coverage rates are offered solely for estimating purposes. Coverage rates can vary considerably due to the porosity of a substrate. A test application will help determine actual coverage rates. Note: these coverage rates have been established in accordance with Federal Specification SS-W-110C performance.

Appearance: VIP1550 goes on WHITE in color but dries to a non-yellowing, non-film forming CLEAR water repellent penetrant.

Packaging: Material sold in 50% concentrated form. Container: 1 Gallon F-style, 4 per case.

Clean Up

Clean all equipment immediately after use with warm, soapy water.

VIP1550 Concentrated Water Repellent is available in the United States, through distributors. Contact your local distributor or the nearest GE Technical Service Center for cost and availability information.

Handling and Safety

Material Safety Data Sheets (MSDS) are available upon request from GE Sealants and Adhesives (GESA). Similar information for solvents and other chemicals used with GESA products should be obtained from your suppliers. When solvents are used, proper safety precautions must be observed. KEEP OUT OF REACH OF CHILDREN.

Do not allow material to freeze. Should VIP1550 freeze prior to use, it will be rendered totally ineffective.

Warranty

GE Sealants & Adhesives warrants the performance of this product, provided it is properly stored and applied before the "use before" date shown. If not satisfied, return product and/or proof of purchase to address below and GE Sealants & Adhesives will, at its option, replace or refund the purchase price of this product. GE shall in no event be liable for any other damages in excess of the amount of the purchase price. THIS IS THE SOLE AND EXCLUSIVE REMEDY FOR DEFECTS IN, OR FAILURE OF, THIS PRODUCT, AND THE SOLE AND EXCLUSIVE LIABILITY OF GENERAL ELECTRIC COMPANY THEREFOR. THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES WRITTEN OR ORAL, STATUTORY, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF THE MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Prior to considering use of a GE Sealants & Adhesives product in fulfilling any government requirement, please contact the Government and Trade Compliance Office at 413-448-4624

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VIP1550 (12/01)

FORMAT: USA

MATERIAL SAFETY DATA SHEET

OMBRELLA

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURED BY:
GE SEALANTS & ADHESIVES
260 HUDSON RIVER ROAD
WATERFORD, NY 12188

EMERGENCY PHONE (24 HRS)
518-237-3330

SUPPLIED BY:
GE SEALANTS & ADHESIVES
260 HUDSON RIVER ROAD
WATERFORD, NY 12188

EMERGENCY PHONE (24 HRS)
518-237-3330

REVISED: 08/11/00
PREPARER: KE LINTZ
CHEMICAL FAMILY/USE: SURFACING PREPARATION
FORMULA: MIXTURE.

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2. COMPOSITION/INFORMATION ON INGREDIENTS

PRODUCT COMPOSITION/ CAS REG NO.	APPROX. WGT. %	ACGIH TLV TWA	ACGIH TLV STEL	OSHA PEL TWA	OSHA PEL STEL	UNITS
1. HAZARDOUS						
POLY(OXY-1,2-ETHANEDIYL), .ALPHA.-ISOTRIDECYL-.OMEGA.-HYDROXY- 9043-30-5	30-60	NE	NE	NE	NE	
MASONRY WATER REPELLANT VENDOR	30-60	NE	NE	NE	NE	
ALKYLALCOHOL-POLYGLYCOLETHER VENDOR	1-5	NE	NE	NE	NE	
ETHYLENE OXIDE 75-21-8	<1PPB	1	NE	1	5	PPM
1,4-DIOXANE 123-91-1	<1PPB	20 SKN	NA	100 SKN	NA	PPM
2. NON-HAZARDOUS						
AMINOALKYL-FUNCTIONAL-POLYDIMETHYLSILOXANE(S) MIXTURE	1-5	NE	NE	NE	NE	

See Section 15 for description of any WHMIS Trade Secret(s).

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3. HAZARDS IDENTIFICATION

*** CONTINUED ON NEXT PAGE ***

EMERGENCY OVERVIEW:
DANGER!
Irritating to skin, eyes, and respiratory tract.

Refer to other MSDS sections for detailed information.
POTENTIAL HEALTH EFFECTS:
INGESTION:
May cause gastrointestinal irritation, nausea, vomiting, and diarrhea.
SKIN CONTACT:
Can cause irritation and reddening of the skin.
INHALATION:
Excessive inhalation causes headache, dizziness, nausea and incoordination.
Avoid breathing any vapors or mist generated during the processing of this material.
Can irritate mucous membranes and respiratory tract with coughing and shortness of breath.
EYE CONTACT:
Causes eye irritation.
MEDICAL CONDITIONS AGGRAVATED:
None known.
SUBCHRONIC (TARGET ORGAN) EFFECTS:
None known
CHRONIC EFFECTS/CARCINOGENICITY:
This product or one of its ingredients present 0.1% or more is NOT listed as a carcinogen or suspected carcinogen by NTP, IARC, or OSHA.
PRODUCTS/INGREDIENTS
This space reserved for special use.
PRINCIPLE ROUTES OF EXPOSURE:
Dermal - skin.
Eyes.
Inhalation.
OTHER:
This product contains methylpolysiloxanes which can generate formaldehyde at approximately 300 degrees Fahrenheit (150'C) and above, in atmospheres which contain oxygen. Formaldehyde is a skin and respiratory sensitizer, eye and throat irritant, acute toxicant, and potential cancer hazard. An MSDS for formaldehyde is available from GE Silicones.

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4. FIRST AID MEASURES

INGESTION:
Do not induce vomiting. If victim is conscious, give 1-3 glasses of water to drink. Never give anything by mouth to
*** CONTINUED ON NEXT PAGE ***

an unconscious person. Get medical attention if irritation persists.
SKIN:
Wash with soap and water.
Get medical attention if irritation or symptoms from Section 3 develop.
INHALATION:
If inhaled, remove to fresh air. If not breathing give artificial respiration using a barrier device. If breathing is difficult give oxygen. Get medical attention.
EYES:
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation

persists.
NOTE TO PHYSICIAN:
Treatment is symptomatic and supportive.

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5. FIRE FIGHTING MEASURES

FLASH POINT:	NA	(C)	NA	(F)
METHOD :	NA			
IGNITION TEMP :	NA	(C)	NA	(F)
FLAMMABLE LIMITS IN AIR - LOWER (%):	NA			
FLAMMABLE LIMITS IN AIR - UPPER (%):	NA			
SENSITIVITY TO MECHANICAL IMPACT (Y/N):	NO			

SENSITIVITY TO STATIC DISCHARGE:
Sensitivity to static discharge is not expected.
EXTINGUISHING MEDIA:
All standard firefighting media
SPECIAL FIREFIGHTING PROCEDURES:
Firefighters must wear NIOSH/MSHA approved positive pressure self-contained breathing apparatus with full face mask and full protective clothing.

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6. ACCIDENTAL RELEASE MEASURES

ACTION TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:
Wipe, scrape or soak up in an inert material and put in a container for disposal.
Wash walking surfaces with detergent and water to reduce slipping hazard.
Wear proper protective equipment as specified in the protective equipment section.
Keep out of water supplies and sewers.

*** CONTINUED ON NEXT PAGE ***

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7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:
Keep container closed when not in use.
Avoid contact with skin and eyes.
Do not inhale vapors.
Avoid accidental ingestion of this material. Wash hands and face before eating, drinking, smoking, using toilet facilities, or applying cosmetics.
Keep from freezing.
Remove contaminated clothing and launder before reuse.
Keep away from children.
Store between 40 F and 120 F.
Product releases formaldehyde during curing.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:
Showers.
Eyewash stations.
See "Ventilation" below.
RESPIRATORY PROTECTION:
If exposure limits are exceeded or respiratory irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Supplied air respirators may be required for non-routine or emergency situations. Respiratory protection must be provided in accordance with OSHA regulations (see 29 CFR 1910.134).
PROTECTIVE GLOVES:
Neoprene.
EYE AND FACE PROTECTION:
Monogoggles.
Safety glasses with side shields.
OTHER PROTECTIVE EQUIPMENT:
Wear eye protection and protective clothing.
VENTILATION:
Ventilation and other forms of engineering controls are preferred for controlling exposures. Respiratory protection may be needed for non-routine or emergency situations.

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9. PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT INFORMATION:

*** CONTINUED ON NEXT PAGE ***

BOILING POINT	:	100	(C) 212	(F)
VAPOR PRESSURE(20 C)(MM HG)	:	UNK		
VAPOR DENSITY (AIR=1)	:	>1		
FREEZING POINT	:	UNK	(C) UNK	(F)
MELTING POINT	:	UNK	(C) UNK	(F)
PHYSICAL STATE	:	LIQUID		
ODOR	:	UNKN		
COLOR	:	CLEAR		
ODOR THRESHOLD (PPM)	:	UNK		
% VOLATILE BY VOLUME	:	69.4		
EVAP. RATE(BUTYL ACETATE=1)	:	<1		
SPECIFIC GRAVITY (WATER=1)	:	UNK		
DENSITY (KG/M3)	:	UNK		
ACID/ALKALINITY (MEQ/G)	:	UNK		
PH	:	UNK		
VOC EXCL.H2O & EXEMPTS(G/L)	:	0.5		
SOLUBILITY IN WATER (20 C)	:	UNKN		

SOLUBILITY IN ORGANIC SOLVENT (STATE SOLVENT): UNKN

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10. STABILITY AND REACTIVITY

STABILITY: STABLE
HAZARDOUS POLYMERIZATION: WILL NOT OCCUR
HAZARDOUS THERMAL DECOMPOSITION/COMBUSTION PRODUCTS:
Carbon monoxide.

Carbon dioxide.
Silicon dioxide.
Formaldehyde.
Hydrocarbons

INCOMPATIBILITY (MATERIALS TO AVOID):
Strong alkalies.
Strong Oxidizing Agents
Strong acids

CONDITIONS TO AVOID:
Strong oxidizers and this product may liberate hydrogen gas.
Avoid contact with strong acids and strong bases.

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11. TOXICOLOGICAL INFORMATION

PRODUCT INFORMATION:	
ACUTE ORAL LD50 (MG/KG):	NONE FOUND
ACUTE DERMAL LD50 (MG/KG):	NONE FOUND
ACUTE INHALATION LC50 (MG/L):	NONE FOUND
OTHER:	

*** CONTINUED ON NEXT PAGE ***

None.

AMES TEST:	UNKNOWN

---

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:	No data at this time
CHEMICAL FATE INFORMATION:	No data at this time

---

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD:
Disposal should be made in accordance with federal, state and local regulations.

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14. TRANSPORT INFORMATION

DOT SHIPPING NAME:	NONE
DOT HAZARD CLASS:	NOT DOT REGULATED
DOT LABEL(S):	NONE
UN/NA NUMBER:	NONE
PLACARDS:	NONE
IATA:	
NOT REGULATED BY IATA	
IMO IMDG-code:	NOT REGULATED FOR OCEAN TRANSPORTATION
EMS No:	NA
EUROPEAN CLASS:	

RID (OCTI): NONE
ADR (ECE) : NONE
RAR (IATA): NONE

---

15. REGULATORY INFORMATION

SARA SECTION 302:
None Found
SARA (311,312) HAZARD CLASS:
NONE
SARA (313) CHEMICALS:
THIS PRODUCT CONTAINS TOXIC CHEMICAL(S) LISTED BELOW WHICH IS(ARE) SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF TITLE III OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 AND 40 CFR PART 372.

*** CONTINUED ON NEXT PAGE ***

ETHANOL, 2-(2-METHOXYETHOXY)-
(111-77-3)
CPSC CLASSIFICATION: NA
WHMIS HAZARD CLASS:
D2B TOXIC MATERIALS
WHMIS TRADE SECRET:
None
EXPORT:
SCHDLE B/HTSUS: 3809.91 Water Repellent Agents
ECCN: -
HAZARD RATING SYSTEMS
HMIS FLAMMABILITY 0 , REACTIVITY 0 , HEALTH 1
NFPA FLAMMABILITY 0 , REACTIVITY 0 , HEALTH 1
CALIFORNIA PROPOSITION 65:
THIS PRODUCT CONTAINS CALIFORNIA PROPOSITION 65 CHEMICALS WHICH ARE LISTED BELOW:

1,4-DIOXANE (123-91-1)
ETHYLENE OXIDE (75-21-8)

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16. OTHER INFORMATION

These data are offered in good faith as typical values and not as product specifications. No warranty, either expressed or implied, is made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate.

C =	ceiling limit	NEGL =	negligible
EST=	estimated	NF =	none found
NA =	not applicable	UNKN =	unknown
NE =	none established	REC =	recommended
ND =	none determined	V =	recomm. By vendor
By-product =	reaction by-product, TSCA inventory	SKN =	skin
		TS =	trade secret

```
status not required under   R    =  recommended
40 CFR part 720.30(h-2)     MST  =  mist
STEL = short term exposure  NT   =  not tested
       limit
```

....

California Proposition 65:
WARNING! This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm.

*** CONTINUED ON NEXT PAGE ***

California Proposition 65...
Warning! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

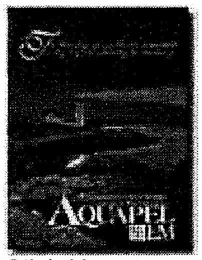
....

*

DATE PRINTED: 08/16/02

L&M Construction Chemicals, Inc.

PRODUCT CATALOG



Click Here to request the **Free Aquapel Literature**

Aquapel & Aquapel Plus

New Generation, Micro-Emulsion, Silane/Siloxane Water Repellent

Product Description

AQUAPEL is a new generation, 100% reactive, waterborne silane-siloxane sealer. This clear, penetrating, breathable water repellent is ideal for use on interior and exterior, above grade concrete. AQUAPEL penetrates the surface and chemically bonds directly with the substrate which results in a surface that is highly resistant to both moisture and salt.

AQUAPEL's unique, odorless, VOC compliant formulation offers permanent, invisible, non-yellowing protection. AQUAPEL's accelerated chemical reaction with the natural minerals in the substrate produces a stable and predictable hydrophobic surface within seven to ten days after application.

AQUAPEL is available in two concentrations. Regular AQUAPEL is ideal for normal duty, cast-in-place concrete with moderate exposure to salt and/or water; AQUAPELPLUS is for increased long-term protection on porous concrete, elevated structural concrete slabs, and normal concrete with severe exposure to salt and water.

Basic Use: AQUAPEL effectively protects buildings, parking decks, monuments, and virtually all concrete surfaces. It offers positive salt screening in northern, as well as southern climates. AQUAPEL's non-flammable, non-volatile formula minimizes corrosion of reinforcing steel and protects concrete from the damaging effects of deicer chemicals, road salts, and other chemicals. AQUAPEL's successful field and lab performance make it ideal for walkways, stairs, parking decks, garages, driveways, dams, piers, bus and truck terminals, precast and prestress concrete. Other uses include architectural concrete, concrete and brick pavers, and exposed aggregate surfaces.

Features & Benefits

- Effectively stops moisture and salt migration
- Odorless/VOC compliant formulation
- Deeply penetrates substrate for long-term hydrophobic protection
- Ready-to-use, non-flammable, non-volatile formulation
- Environmentally safe.
- Invisible, non-darkening.

*Limitations:*AQUAPEL should not be applied if air, product, and/or surface temperature is below 4°C (40°F) or above 40°C (100°F). Avoid application if precipitation is expected with four hours, or if rain has preceded the application in the past 24 hours. AQUAPEL is not intended for below grade waterproofing. Over application of AQUAPEL may cause a slight darkening of the surface. Avoid application in high winds.

Estimating

AQUAPEL is packaged ready-to-use in 3.875 liter (1 gal.), 19 liter (5 gal.) pails, and 208 liter (55 gal.) drums. Containers are identified with product name and batch code. Shelf life in unopened containers is 1 year.

Technical Specs

TECHNICAL DATA

	AQUAPEL	AQUAPELPLUS
Color, Milky White Liquid	Dries Clear	Dries Clear
Surface Gloss	None	None
NCHRP 244 Series II, Water Absorption Reduction, % min.	84	85
NCHRP 244 Series II, Chloride Intrusion Reduction, % min.	84	90
Depth of Penetration (mm) (Depending upon substrate porosity)	2-4	2-4
ASTM C 672, Scaling Test (0 rating="no scaling")	0	0
SS-W-110 C, Water Absorption,Brick, % effective	88	92
Number of Coats, normally	One	One
Application Rate, average	125	125
VOC	<50	<50

COVERAGE RATE

Average rate is determined by surface porosity

Surface Type	m^2/L	SF/gal
Porous Surfaces	2.5-3.0	100-125
Broom Finish	3.5-5.0	100-150

Smooth Concrete	2.5-3.5	150-200

Installation

Preparation: Concrete must be structurally sound and clean of all dirt, laitance, contaminants, oil, existing coatings or membrane curing compounds by chemical or mechanical means. Remove unsound concrete. Repair deteriorated area with DURAPATCH. Rout and fill cracks. Caulking and sealant materials must cure a minimum of 12 hours before applying AQUAPEL.

New Concrete: Apply non-residual curing compound, L&M CURE, or water cure fresh concrete for best results. Allow concrete to cure a minimum of 21 days before applying AQUAPEL. Remove surface laitance and other contaminants by pressure wash.

Installation: Stir AQUAPEL before using to disperse active ingredients. Do not dilute. Apply AQUAPEL directly from sealed containers using low pressure (1.5 kg/cm/20 psi) spray with fan nozzle, roller or bristle broom.. Apply in a single, uniform, saturating application. Broom out all puddles. On extremely porous substrates, two coats may be necessary. Apply second coat as soon as surface drying of first coat has become visible.

Clean Up: Clean up equipment and overspray immediately with soap and water. For dry material use mineral spirits.

NOTE: In approximately seven to ten (7-10) days after application, surfaces treated with AQUAPEL or AQUAPEL PLUS will develop full, long-term water repellent properties.

Precautions

Applicators should wear rubber gloves and eye protection. Protect glass, plastic products, shrubbery, and plant life from overspray by masking, using drop cloths, tarps, etc. Do not allow overspray to remain on these materials beyond the workday. Avoid contact with all food stuffs. Protect containers from direct sunlight , rain, and freezing. AQUAPEL is destroyed by freezing. Please refer to the material safety data sheet (MSDS) for more detailed information.

Warranty

L&M warrants that AQUAPEL and AQUAPELPLUS in sealed containers are VOC compliant, free of contaminants, and, when used as instructed, will provide effective protection to treated surfaces from moisture and chloride-ion penetration. Contact L&M for available five and ten year performance warranty.

Technical Services

L&M recommends that the user request the service of the local representative for a pre-job conference to plan the installation of AQUAPEL. To the extent that job site services are provided, such services are in the nature of technical recommendations only and will not include supervision or quality control of application procedures or engineering details.

Fax On Demand

Instant access to Concrete Information. L&M's exclusive Fax On Demand offers instant access to Tech Data Sheets, MSDS Sheets, test data, product updates, and vital information. Simply call 1-800-839-9887 and follow the easy steps to Fax On Demand. L&M is ready to respond instantly to your fax machine - anytime - anywhere!

Short Spec

07180: Water repellent treatment (Horizontal Concrete):

A) (Cast in place concrete with moderate exposure for salt and/or water). VOC compliant, odorless, silane/siloxane blend. Surpasses NCHRP 244, Series II, reducing water and salt penetration by 84%. "AQUAPEL" by L&M Construction Chemicals, Inc. Five year warranty.

B) (Porous concrete surfaces or normal concrete with severe exposure to salt and/or water.) VOC compliant, odorless, silane/siloxane blend. Surpasses NCHRP 244 Series II, reducing water penetration by 85% and salt penetration by 90%. "AQUAPEL+PLUS" by L&M Construction Chemicals, Inc. Ten year warranty.

C) For vertical applications, see HYDROPEL WB and/or HYDROBLOCK.

#704081-2
November 11, 1997

MATERIAL SAFETY DATA SHEET
Prepared according to 29 CFR 1910.1200

DATE PREPARED: September, 1991
DATE REVISED: March, 2001

MSDS NO: 221

SECTION I - IDENTIFICATION

L&M CONSTRUCTION CHEMICALS, INC.
14851 CALHOUN ROAD
OMAHA, NE 68152

ASSISTANCE (CHEMTREC) 800-424-9300
EMERGENCY PHONE NO. 402-453-6600

ID NO.: Non-regulated

PRODUCT
NAME: **AQUAPEL**

DOT CLASS: Non-regulated

CHEMICAL
NAME: Alkylalkoxysilane Solution

DOT SHIPPING
NAME: Non-regulated

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

INGREDIENTS	OSHA PEL	ACGIH TLV	CAS

Unlisted ingredients are not hazardous per OSHA Standard 29CFR 1910.1200 and are considered to be trade secrets of L&M Construction Chemicals, Inc.

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT (F): 212
VAPOR PRESSURE (mm Hg): N/M
VAPOR DENSITY (AIR = 1): N/M
SOLUBILITY IN WATER: Miscible
APPEARANCE: White Liquid
ODOR: Odorless

SPECIFIC GRAVITY (H_2O = 1): 1.00
PERCENT VOLATILE BY VOLUME: N/M
MELTING POINT: N/Ap
BULK DENSITY: 8.33#/gal
PH INFORMATION: 8.5
Evaporation Rate <1

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

HAZARDS FIRES: Slight
FLASH POINT, °F, (TCC): None
FLAMMABLE LIMITS - LEL: N/Ap UEL: N/Ap

EXTINGUISHING MEDIA: Use foam, CO_2, or dry chemical fighting apparatus

SPECIAL FIRE FIGHTING PROCEDURES: Water may be ineffective. Wear full protective clothing including a self-contained breathing apparatus.

SECTION V - REACTIVITY DATA

STABILITY: unstable: stable: X
INCOMPATIBILITY (materials to avoid): None with proper storage.
HAZARDOUS DECOMPOSITION OR BYPRODUCTS: After a long time small amounts of Ethanol may be formed by hydrolysis.
HAZARDOUS POLYMERIZATION: may occur: will not occur: X
CONDITIONS TO AVOID: Flame or other sources of ignition

SECTION VI - HEALTH HAZARD DATA

POTENTIAL EFFECTS OF EXPOSURE (listed by primary routes of entry)

INGESTION: No harmful effects have been reported upon ingestion.

INHALATION: No harmful effects have been observed.

SKIN: No harmful effects have been observed.

EYE CONTACT: May produce an oil film causing a brief reversible dimness of sight.

EMERGENCY & FIRST AID PROCEDURES
INHALATION: Remove person to fresh air. If breathing is difficult, administer oxygen. Call a physician.

SKIN: If this product comes in contact with the skin, wash with soap and large quantities of water and seek attention if irritation from contact persists.

INGESTION: No harmful effects expected. Contact a doctor if any adverse effects are noticed upon ingestion.

EYE CONTACT: If this product comes in contact with the eyes, flush with large quantities of water for at least 15 minutes and seek immediate medical attention.

CARCINOGENICITY OSHA: No NTP: No IARC: No

SECTION VII - PRECAUTIONS FOR SAFE HANDLING & USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Small Spill: Absorb liquid on paper, floor absorbent or other material and transfer hood. Large Spill: Eliminate all ignition sources. Persons without protective equipment should be moved from area until clean-up is completed. Stop spill at source. Dike to prevent spreading. Pump spill into salvage tank. Pick up remaining in floor absorbent material and shovel into containers. Prevent run-off into sewer, streams or bodies of water.

WASTE DISPOSAL METHOD: Small Spill: Allow volatile portion to evaporate. Destroy remaining by burning in an iron pan. Large Spill: Destroy by liquid incineration. Deposit contaminated absorbent in a landfill in accordance with local, state and federal regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING & STORAGE: Keep containers cool, dry and away from sources of ignition. Use and store with adequate ventilation. Formation of ethanol by hydrolysis may occur when a storage time of six months will be exceeded.

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION: Use mechanical exhaust ventilation where mists or spray may be generated in enclosed areas.

VENTILATION
LOCAL EXHAUST: May be required if specified
SPECIAL: Required only in extreme cases

PROTECTIVE GLOVES: Impermeable EYE PROTECTION: Safety glasses, chemical goggles or face shields

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: None

WORK/HYGIENIC PRACTICES: Wash hands before breaks and after working.

END OF MSDS

MATERIAL SAFETY DATA SHEET
Prepared according to 29 CFR 1910.1200

DATE PREPARED: September, 1991
DATE REVISED: March, 2001

SECTION I - IDENTIFICATION

L&M CONSTRUCTION CHEMICALS, INC.
14851 CALHOUN ROAD
OMAHA, NE 68152

ASSISTANCE (CHEMTREC) 800-424-9300
EMERGENCY PHONE NO. 402-453-6600

ID NO.: Non-regulated

PRODUCT
NAME: **AQUAPEL PLUS**

DOT CLASS: Non-regulated

CHEMICAL
NAME: Alkylalkoxysilane Solution

DOT SHIPPING
NAME: Non-regulated

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

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SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT (F): 212
VAPOR PRESSURE (mm Hg): N/A
VAPOR DENSITY (AIR = 1): N/M
SOLUBILITY IN WATER: Miscible
APPEARANCE: White Liquid
ODOR: Odorless

SPECIFIC GRAVITY (H_2O = 1): 1.00
PERCENT VOLATILE BY VOLUME: N/M
MELTING POINT: N/Ap
BULK DENSITY: 8.33#/gal
PH INFORMATION: 8.5
EVAPORATION RATE: <1

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

HAZARDS FIRES: Slight

FLASH POINT, °F, (TCC): None

FLAMMABLE LIMITS - LEL: N/Ap UEL: N/Ap

EXTINGUISHING MEDIA: Use foam, CO_2, or dry chemical fighting apparatus

SPECIAL FIRE FIGHTING PROCEDURES: Water may be ineffective. Wear full protective clothing including a self-contained breathing apparatus.

SECTION V - REACTIVITY DATA

STABILITY: unstable: stable: X
INCOMPATIBILITY (materials to avoid): None with proper storage and handling.
HAZARDOUS DECOMPOSITION OR BYPRODUCTS: After a long time small amounts of Ethanol may be formed.
HAZARDOUS POLYMERIZATION: may occur: will not occur: X
CONDITIONS TO AVOID: Flame or other sources of ignition

SECTION VI - HEALTH HAZARD DATA

AQUAPEL PLUS

POTENTIAL EFFECTS OF EXPOSURE (listed by primary routes of entry)

INGESTION: No harmful effects have been reported upon ingestion.

INHALATION: No harmful effects have been observed.

SKIN: No harmful effects have been observed.

EYE CONTACT: May produce an oil film causing a brief reversible dimness of sight.

EMERGENCY & FIRST AID PROCEDURES

INHALATION: If affected, remove person to fresh air. If breathing is difficult, administer oxygen. Call a physician.

SKIN: If this product comes in contact with the skin, wash with soap and large quantities of water and seek attention if irritation from contact persists.

INGESTION: No harmful effects expected. Contact a doctor if any adverse effects are noticed upon ingestion.

EYE CONTACT: If this product comes in contact with the eyes, flush with large quantities of water for at least 15 minutes and seek immediate medical attention.

CARCINOGENICITY OSHA: No NTP: No IARC: No

SECTION VII - PRECAUTIONS FOR SAFE HANDLING & USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Small Spill: Absorb liquid on paper, floor absorbent or other material and transfer hood. Large Spill: Eliminate all ignition sources. Persons without protective equipment should be moved from area until clean-up is completed. Stop spill at source. Dike to prevent spreading. Pump spill into salvage tank. Pick up remaining in floor absorbent material and shovel into containers. Prevent run-off into sewer, streams or bodies of water.

WASTE DISPOSAL METHOD: Small Spill: Allow volatile portion to evaporate. Destroy remaining by burning in an iron pan. Large Spill: Destroy by liquid incineration. Deposit contaminated absorbent in a landfill in accordance with local, state and federal regulations.
PRECAUTIONS TO BE TAKEN IN HANDLING & STORAGE: Keep containers cool, dry and away from sources of ignition. Use and store with adequate ventilation.
OTHER PRECAUTIONS: Avoid inhalation of vapors. Avoid personal contact with the product.

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION: Use mechanical exhaust ventilation where mists or spray may be generated in enclosed areas.

VENTILATION
LOCAL EXHAUST: May be required if specified
SPECIAL: Required only in extreme cases

PROTECTIVE GLOVES: Impermeable EYE PROTECTION: Safety glasses, chemical goggles or face OTHER PROTECTIVE CLOTHING OR EQUIPMENT: None

WORK/HYGIENIC PRACTICES: Eye washes and safety showers in work area recommended. Wash hands before breaks and after working.

END OF MSDS

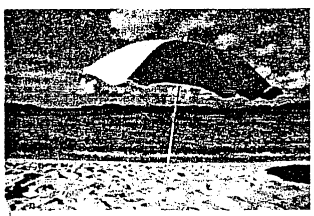
Blok-Lok®
Clear Water Repellent

RAIN GUARD®

Technical Data
Division 7 Water Repellent
CSI Section 7100

Product Description and Uses

Rainguard *BLOK-LOK* with *MICRO-LOK* Clear Water Repellent is a water base, modified polysilane repellent composed of high quality chemical solids, blended to create a clear, deep penetrating and non-film forming chemically reactive masonry water repellent that contains no silicone oils, paraffin wax or urethanes. *MICRO-LOK* creates a micro-molecular chemical and mechanical bond between the water-repellent chemicals and the substrate. *BLOK-LOK* penetrates deep into porous masonry surfaces to provide long lasting and virtually indestructible water repellent protection that is not affected by weather or sunlight. *BLOK-LOK* is V.O.C. compliant. Helps prevent spalling and cracking caused by freeze thaw cycles. Helps prevent chloride ion intrusion and efflorescence.


At Rainguard We've Got You Covered!

BLOK-LOK provides superior grade, heavy-duty water repellent performance on a wide variety of porous vertical surfaces such as:

- masonry block
- Concrete
- Stucco
- EFIS or cement plaster
- and may be used on composite construction with a variety of substrates.

BLOK-LOK does not alter surface colors or textures. *BLOK-LOK* is maintenance free.

How To Use

New masonry and concrete surfaces shall be allowed to cure for 28 days to neutralize alkalinity and release residual moisture. All surfaces to be coated shall be structurally sound, clean and dry free of laitance, accumulated dirt and grime, efflorescence, lime run, form oils and release agents, grease, mud, excess mortar and mold and mildew, etc. When possible use a dry cleaning method such as abrasive blasting, brooming, or high-pressure air to remove surface contaminates. Use high-pressure water if wet cleaning is necessary and allow adequate (3-5 days) drying time to assure uniform penetration of the water repellent. On previously painted surfaces, remove all existing paint or coatings using high-pressure water or abrasive blasting.

All cracks (other than hairline) shall be pointed or caulked. All voids and bee-holes or other masonry surface defects shall be repaired using knife or brush grade elastomeric, urethane or other approved patching. Defective mortar joints shall be routed out, pointed with mortar or caulk and tooled. Seal or caulk all exterior openings such as conduits, pipes drains, door frames, vents, air conditioner openings, electrical openings, control joints or any dissimilar materials using urethane or elastomeric or any approved caulk or sealer. Allowing patching materials and sealers to cure prior to application of *BLOK-LOK*.

BLOK-LOK is best and most economically applied using low-pressure commercial airless spray equipment. Equipment shall not atomize material but should flow material on the wall at a minimum rate of 1 to 1½ gallons per minute. Use a tip size of .060 to .110.

Rainguard *BLOK-LOK* is supplied ready to use. DO NOT THIN. Avoid application in windy weather. In hot weather, lightly dampen surfaces with clean fresh water to avoid premature drying and a flash cure that may cause a whitish residue. Trigger gun off at the end of each pass to avoid using excessive materials. Stop all applications only at corners, joints, seams or edges. **Never apply more than one coat. DO NOT OVER APPLY.**

***Caution**: Rainguard BLOK-LOK will not penetrate through painted or damp surface areas.*

Applications:

Dense Masonry

Porous Masonry

Vertical Surfaces

Horizontal Surfaces

EFIS Surfaces

Features and Benefits:

- Superior grade water repellent protection for porous masonry surfaces
- Exclusive *MICRO-LOK* formulation
- Protection not effected by weathering or UV light
- 1 coat application
- V.O.C. compliant
- Maintenance free
- Breathable - does not trap moisture
- Warranty available

Porous Masonry Surfaces: Apply 1 (only) flood coat using low-pressure spray equipment. Start at the top of the wall and work down using overlapping horizontal passes. Spray head should be held 8 to 12 inches from the surface so that the flood coat runs freely down the wall approximately 6-12 inches below the point of application.

Dense Masonry Surfaces: Apply 1 (only) saturation coat using low-pressure spray equipment. Start at the top of the way and work down using overlapping horizontal passes.

Actual coverage rates may vary due to surface porosity.

Porous Surfaces	Square Feet Per Gallon
Precision Block	60-70
Sandblasted Precision	60-70
Split face Block	55-65
Scored/Fluted Block*	55-65*
Lightweight Block	40-55
Slump Block	70-90
Adobe Block	70-90
Clay Block	50-60
EFIS	80-120
Concrete	80-120

*Notes: *Use of fluted or scored block or raked joints will increase surface areas by 20%-30% or more and decrease coverage rates. Allow for this increased surface area when determining material requirements.*

- *Test Panel*

Always apply material to a mock wall or test panel, test wall or actual surface area to determine acceptable color, surface porosity, application rates and methods before starting general application. Approve sample surface prior to general application.

Precautions & Limitations

New masonry and concrete shall be allowed to cure for 28 days prior to application. At time of application, moisture content of all surfaces shall be 15% or less as measured with an electronic moisture meter. Cured masonry shall be allowed four to seven days drying time following a rainfall prior to application. In climates where freezing temperatures have existed prior to application, allow adequate time for surfaces to thaw. In hot weather, lightly dampen surfaces with clean fresh water prior to application to prevent a flash cure of material. Do not apply if ambient air or surface temperatures are below 45° or over 90° F, if temperatures are expected to drop below freezing with 24 hours or if rain is imminent.

*Caution: Never apply more than one coat. Over application may result in a whitish residue on some surfaces. Do not apply to previously sealed or painted surfaces. Consult manufacturer for application recommendations. **Notes:** Clear water repellents are not designed to waterproof horizontal masonry surfaces such as ledges, sills, cornices and parapet walls, etc. Contact manufacturer for proper treatment recommendations.*

Technical Data

Technical services, specification assistance or information regarding application requirements of this product is available from Rainguard Products Company at (949) 675-2811.

Material Type	Modified Polysilane
Active Solids Content	Approximately 10.0%
Color of Material	Clear to Slightly Cloudy
Odor	Slight Ammonia Odor
Appearance When Dry	Penetrates Into Substrate-No Surface Film.
V.O.C.	>40 g/L V.O.C. Compliant
Flash Point	Non-Flammable
pH Value	Approximately 12.5
Viscosity	9.6 Seconds No. 4 Ford Cup
Weight	Approximately 8.7 lbs./gal.
Surface Dry Time Approx	1 Hour @ 70° F with 50% .
Recoat	24 Hours
Full Chemical Cure	24-36 Hours

Test Data

Wind Driven Rain ASTM E-514-86	98.7% Leak Red
Water Pen Fed Spec SS-W-110C	75% Min Req 96.8% Leak Red
Chloride Ion Intr Salt Pounding NCHRP No. 244	Allowed 25% - Obtained 13.0%
Water Abs CMU ASTM C140-75	89% Effective
Water Vapor Trans ASTM D-1653	100% Vapor Perm
Water Repellency ASTM C67-80A	97% Effective
Weathering ASTM G-53	2500 Hours - No Change

Limited Warranty Information

The information contained herein is offered in good faith and is believed to be accurate. Accordingly, Rainguard International Products Company provides limited warranties for its' products.

For additional information, or to determine warranty options please contact, please contact Rainguard International Products Company.

Corporate Office

Rainguard International Products Company
3334 E Coast Hwy, #201
Corona del Mar CA 92625
United States of America

Phone: 1-949-675-2811
Fax: 1-949-675-3450
Web Site: www.rainguard.com
Email: rainguardinfo@rainguard.com

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: RAINGUARD BLOK-LOK, SUPER, REGULAR CONCRETE AND MASONRY WATERPROOFER

MHIS CODE: H F R P
3 0 0

SECTION I - MANUFACTURER INFORMATION

MANUFACTURED FOR:	RAINGUARD PRODUCTS COMPANY
ADDRESS:	3334 E. Coast Highway #201 Corona del Mar, CA 92625
INFORMATION PHONE:	(949) 675-2811
EMERGENCY PHONE:	CHEMTREC: (800) 424-9300
EFFECTIVE DATE:	01/01/03

SECTION IA - PRODUCT IDENTIFICATION

CHEMICAL FAMILY:	Potassium Siliconate
CHEMICAL NAME:	Not Applicable
FORMULA:	Not Applicable

SECTION II - REPORTABLE COMPONENTS/SARA III INFORMATION

REPORTABLE COMPONENTS	CAS NUMBER	OSHA PEL	EXPOSURE ACGIH TLV	OTHER LIMITS	VAPOR PRESSURE	WEIGHT PERCENT
Potassium Hydroxide	1310-58-3	2 mg/m3 (ceiling)	2 mg/m3 (ceiling)		23mm Hg @ 68 F.	

Chemical compounds contained in Section II are confidential and are considered trade secrets. No toxic chemical(s) subject to the reporting requirements of Section 313 of Title III and of 40 CFR 372 are present in excess of the applicable de minimis concentrations as specified in Section 372.38(a). WARNING: THIS PRODUCT DOES NOT CONTAIN ANY SUBSTANCES KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER OR REPRODUCTIVE HARM.

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT:	212 degrees F
PERCENT VOLATILE (By Weight):	Approximately 60%
SPECIFIC GRAVITY (Water = 1):	1.30
VAPOR DENSITY (Air =1) :	Not Determined
SOLUABILITY IN WATER:	100.0 %
APPEARANCE & ODOR:	Colorless to yellow liquid with mild odor
EVAPORATION RATE (Ether = 1):	Not Determined
pH:	Approximately 13

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Degrees F):	Not Applicable	
METHOD USED:	Not Applicable	
FLAMMABLE LIMITS IN AIR:	LEL: Not Determined	UEL: Not Determined

EXTINGUISHING MEDIA:
Use water spray, dry chemicals or carbon dioxide.

SPECIAL FIREFIGHTING PROCEDURES
Material is not considered a fire hazard. Use standard fire fighting techniques to extinguish fires involving this material. As in any fire, prevent human exposure to fire, smoke, fumes or products of combustion. Firefighters should wear full-face, self-contained breathing apparatus and impervious protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS
None established.

SECTION V - REACTIVITY DATA

STABILITY
Stable under normal conditions.

CONDITIONS TO AVOID
May be corrosive to aluminum and steel.

CHEMICAL REACTIVITY
Incompatible with acids and dispersed metals

HAZARDOUS DECOMPOSITION OR BYPRODUCTS
Burning can produce carbon monoxide, carbon dioxide and traces of incompletely burned hydrocarbons.

HAZARDOUS POLYMERIZATION
Will not occur.

SECTION VI - HEALTH HAZARD DATA

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Inhalation of vapors or mist can cause mild irritation to serious respiratory tract damage and severe pneumonia.

SKIN CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Skin contact can cause burns.

EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Eye contact can cause burns.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Not expected in industrial use.

HEALTH HAZARDS (ACUTE AND CHRONIC)
Acute Overexposure: Refer to ingestion routes of exposure.
Chronic Overexposure: Prolonged contact with dilute solutions or dust has a destructive effect on tissue.

CARCINOGENICITY
NTP Carcinogenic: No
IARC Monographs: No.
OSHA Related: No.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
There is no data available which address medical conditions that are generally recognized as being aggravated by exposure to this product. Pre-existing skin, eye and respiratory disorders, however, may be aggravated by exposure to this product.

SECTION VII- FIRST AID PROCEDURES

INHALATION:
If inhaled, remove to fresh air and administer oxygen if breathing is difficult. If breathing has stopped, start artificial respiration at once. Seek immediate medical attention.

INGESTION
Never give an unconscious person anything to drink. If unconscious, treat for shock. Notify a physician or the nearest poison control center immediately. If conscious, have the person rinse mouth with cold water. Do not induce vomiting (vomiting may occur naturally, but it should be avoided if possible). If unconscious and vomiting, turn the person on his side to avoid choking.

SKIN CONTACT
Remove excess material from the skin with a waterless skin cleaner. Flush skin with plenty of water and wash exposed areas with soap and water. Remove contaminated clothing and footwear. Seek immediate medical attention. Wash contaminated clothing and footwear before reuse.

EYES
In case of contact, flush eyes and eyelids with large amounts of running water for at least 15 minutes. Hold eyelids apart to ensure rinsing of the entire surface of the eye and lids with water. Seek immediate medical attention.

MATERIAL SAFETY DATA SHEET

SECTION VIII - PRECAUTIONS FOR SAFE HANDLING & USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Make sure all personnel involved in the spill cleanup follow good industrial hygiene practices. Any person entering either a significant spill area or an unknown concentration of vapor or aerosol should use a positive-pressure, self-contained breathing apparatus or a positive-pressure, supplied-air respirator with escape pack.

Neutralize spills with a mild acid solution (like acetic acid) before attempting clean-up.

Small spills can be handled routinely. Use adequate ventilation and wear a NIOSH-approved respirator with dust, mist and fume filter to prevent inhalation exposure. Wear protective clothing to prevent skin and eye contact.

Ventilate confined spaces. Dike and soak up spill with absorbent material such as sand or Fuller's earth. Recover free liquid and absorbent material from spill area and place into an appropriate chemical waste container for proper disposal. Flush spill area with water. Observe all local, state and federal laws and regulations regarding disposal, cleanup, removal or discharge.

WASTE DISPOSAL MEHOD
Material that cannot be used or chemically reprocessed should be disposed of at an approved facility in accordance with applicable regulations under the Resource Conservation and Recover Act (RCRA). Dispose of waste materials and empty containers in accordance with all federal, state and local health, safety and environmental regulations. Empty containers may contain residual material. Do not reuse containers unless properly reconditioned.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Keep containers tightly closed, even when empty. Protect from freezing. Store in a cool, dry, well-ventilated area. Exercise caution to prevent damage to the container. Avoid breathing vapors and mist. Avoid contact with skin and eyes. Keep out of the reach of children.

SECTION IX - CONTROL MEASURES

RESPITORY PROTECTION
If used in well ventilated or open areas, use appropriate NIOSH approved dust, mist and fume cartridge respirator equipment. If used in an area without adequate ventilation, employees should be provided with appropriate, approved, air-purifying or supplied-air respirators selected in accordance with NIOSH guidelines.

VENTILATION
Local exhaust and mechanical ventilation in confined spaces is recommended to keep airborne vapor concentrations below exposure limits.

PROTECTIVE GLOVES
Use solvent resistant gloves (PVA, nitrile, neoprene or fluoroelastomer, etc.) are recommended.

EYE PROTECTION
Chemical resistant splash goggles or face shield selected with regard for use condition exposure potential.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT
Long sleeved clothing selected for use with regard to exposure potential is recommended.

WORK/HYGENIC PRACTICES
Wash hands and before eating or smoking.

EXPOSURE LIMITS
No exposure limit has been established for this material. Exposure limits for its hazardous components, if any, are listed in Section II on page one.

SECTION X – REGULATORY INFORMATION

TSCA: This material or its components are listed on the TSCA Chemical Substance Inventory and is in compliance with all applicable rules and orders. One or more of the components may be exempt from listing on the TSCA Inventory.

RCRA Hazard Class:
D002

Proper Shipping Name:	Potassium hydroxide solution
Hazard Class or Division:	8
Packing Group:	II
UN/UA Number:	UN 1814
Label Required:	Corrosive
Hazardous Substance RQ (Name):	Potassium hydroxide 1000#
Inhalation Hazard (173.3a (b)):	Not applicable

This material or its components are listed on the Canadian Domestic Substance List (DSL).

SECTION X – REGULATORY INFORMATION (con.)

CANADIAN INGREDIENT DISCLOSURE LIST: This material contains the following listed components in quantities greater than the specified weight to weight concentrations: Potassium hydroxide.

CALFIORNIA PROPOSITION 65: This material does not contain any substances known to the State of California to cause cancer or reproductive effects.

MASSACHUSSETTS SUBSTANCE LIST: This material contains the following listed components: Potassium hydroxide.

PENNSYLVANIA HAZARDOUS SUBSTANCE LIST: This material contains the following listed components: Potassium hydroxide.

NEW JERSEY R-T-K HAZARDOUS SUBSTANCE LIST: This material contains the following listed components: Potassium hydroxide.

SECTION XI – DISCLAIMER

THIS INFORMATION RELATES TO THE SPECIFIC MATERIAL DESIGNATED AND MAY NOT BE VALID FOR SUCH MATERIAL WHEN USED IN COMBINATION WITH OTHER MATERIALS OR IN ANY PROCESS. THE INFORMATION CONTAINED HEREIN IS BELIEVED TO BE ACCURATE AND RELIABLE AS OF THE DATE COMPILED. HOWEVER, NO REPRESENTATION, WARRANTY OR GUARANTEE, EXPRESSED OR IMPLIED, IS MADE AS TO ITS ACCURACY, RELIABILITY OR COMPLETENESS. IT IS THE USER'S RESPONSIBILITY TO SATISFY THEMSELVES AS TO THE SUITABILITY AND COMPLETENESS OF SUCH INFORMATION FOR THEIR OWN PARTICULAR USE. MANUFACTURER DOES NOT ASSUME ANY LIABILITY FOR ANY LOSS OR DAMAGE THAT MAY OCCUR FROM THE USE OF THIS INFORMATION. NOTHING CONTAINED HEREIN SHALL BE CONSTRUED AS A RECOMMENDATION FOR USE(S) WHICH INFRINGE VALID PATENTS OR AS EXTENDING A LICENSE UNDER VALID PATENTS.

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MASONRY
COATING SYSTEMS
Concrete Solutions. Solid Results.

CONFLEX XL

TEXTURE HIGH BUILD
A5-800 SERIES

CHARACTERISTICS

ConFlex XL Texture High Build Coating is an elastomeric coating which provides excellent flexibility, durability, and weather resistance. This product will protect against wind-driven rain when used on tilt-up, precast, or poured-in-place concrete, CMU, and stucco.
This may be applied to a surface with a pH of 6 to 12.

Color: Most colors
1 coat system, spray applied, coverage per coat:
70-80 sq ft/gal
20.0 - 23.0 mils wet; 9.4 - 11.0 mils dry
Coverage will vary with the substrate and the texture.
Drying Time, @ 77°F, 50% RH:
temperature and humidity dependent
Touch: 4 hours
Recoat: 24 hours
Flash Point: N/A
Finish: 0-10 units @ 85°
Tinting with Blend-A-Color:

Base	oz/gal	Strength
Extra White Base	0-5	100%
Deep Base	4-12	100%

Vehicle Type: Acrylic
A5W800
VOC (less exempt solvents):
94 g/L; 0.79 lb/gal
Volume Solids: 49 ± 2%
Weight Solids: 60 ± 2%
Weight per Gallon: 10.4 lb

Mildew Resistant
This coating contains agents which inhibit the growth of mildew on the surface of this coating film.

PHYSICAL PROPERTIES

Elongation
ASTM-D412 .... 300%
1 coat, 9.4 mils dft, 7 day cure @ 77°F & 50% RH
Freeze - Thaw Resistance
ASTM D2243 .... Passes
Low Temperature Flexibility
ASTM D522 @10°F .... Passes
Tensile Strength
ASTM-D412 .... 300 PSI
1 coat, 9.4 mils dft, 7 day cure @ 77°F & 50% RH
Water Vapor Permeance
ASTM-E96 .... 22 perms
1 coat, 9.4 mils dft, 7 day cure @ 77°F & 50% RH
Wind-Driven Rain Test
TT-C-555B .... Passes
98 m.p.h. wind velocity Section 4.4.7
These results are based upon tests conducted by or on behalf of The Sherwin-Williams Company and are general indicators of performance only. Application, conditions, dry and cure times, film thickness, and test interpretation can influence the results.

SPECIFICATIONS

A minimum total dry film thickness of 12 - 15 mils (excluding texture) and a surface with 10 or less pinholes per square foot is required for a waterproofing system.
Concrete, Stucco
1 ct. Loxon Acrylic Primer
or Loxon Conditioner
1 ct. ConFlex XL High Build (optional)
1 ct. ConFlex XL Texture High Build
Concrete Block, CMU, Split-face Block
1 ct. Loxon Surfacer
or Loxon Acrylic Primer
or Loxon Conditioner
1 ct. ConFlex XL High Build
1 ct. ConFlex XL Texture High Build
Previously Coated
1 ct. Loxon Conditioner
1 ct. ConFlex XL Texture High Build

SURFACE PREPARATION

WARNING! Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.

Remove all surface contamination by washing with ProClean Professional™ 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.

Concrete, Stucco
If needed, pressure clean with a minimum of 2100 psi to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, peeling and defective coatings, chalk, form release agents, moisture curing membranes, etc. Remove all mildew. Allow the surface to dry thoroughly. Scrape and sand existing peeled or checked paint to a sound surface. Sand glossy surfaces dull. Concrete and mortar must be cured at least 7 days at 75°F. On tilt-up and poured-in-place concrete, commercial detergents and sandblasting may be necessary to remove sealers, release compounds, and to provide an anchor pattern. Fill bugholes, air pockets,cracks, and other voids with ConSeal Sealant or Patch.

continued on back

ConFlex XL
Texture High Build
A5-800 Series

SURFACE PREPARATION

Masonry surfaces must be dry, 15% or less of water, and within a pH range of 6 to 12. If the pH is above 12, prime the surface first with Loxon Primer, Loxon Conditioner, or Loxon Surfacer.

Sealing and Patching—After cleaning the surface thoroughly, prime any bare surface with Loxon Acrylic Primer or Loxon Conditioner, apply ConSeal Sealant or Patch if needed, allow to dry, then topcoat.

To improve the performance consider:
- Use caution when preparing the substrate to create a uniform surface.
- Cracks, crevices, and through-wall openings must be patched using ConSeal Sealant or Patch.
- Fill voids and openings around window and doors using ConSeal Sealant or Patch.
- Stripe coat all inside and outside corners and edges with 1 coat of ConFlex XL High Build Coating.

APPLICATION

Apply at temperatures between 50°F and 100°F. **Do not reduce.**
Brush, small areas only - Use a nylon/polyester brush. Avoid over-brushing which causes air bubbles.
Roller, small areas only - Use a ½" to 1½" nap synthetic roller cover. Avoid rapid rolling which causes bubbling.
Must be specifically designed for aggregate coatings

Spray

Graco .... Texspray HP Compact
Pressure ..... 30-35 psi air to the pump
Tips: .... 3/16" or 1/4"
Reduction .... none
Titan .... Super Tex 6
Pressure .... 35 psi air to the pump.
Hose .... 3/4"
Tips .... 3/16" or 1/4"

The substrate and its condition will determine the application procedure. Considerations to minimize pinholes:
- 2 coat application with overnight drying between coats
- Spray application with backrolling
- Power rolling

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 in areas subject to wear, as the texturing material may wear off of the surface.
Not for use on horizontal surfaces (floors, roofs, decks, etc.) where water will collect.
Not for use on overhead horizontal surfaces (under sides of balconies, soffits, etc.)
Not for use below grade. Will not withstand hydrostatic pressure.

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 approved) 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 approved). 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, Call Poison Control Center, hospital emergency room, or physician 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 and birth defects or other reproductive harm. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN.
LCE 10/28/01 A5W800 02 00

Material Safety Data Sheet

Document Code: Conflex
Version: 01

Date of Preparation
August 8, 2001

Section 1 - Product and Company Identification

PRODUCT NAME & NUMBERS

ConFlex XL High Build Coating

White	A5W401
Midtone Base	A5W402
Extra White	A5W451
Deep Base	A5W453

ConFlex XL Texture High Build Coating

Fine Texture Extra White	A5W800
Fine Texture Deep Base	A5W803
Medium Texture	A5W810
Medium Texture Deep Base	A5W813
Extra Coarse Texture	A5W820
Extra Coarse Texture Deep Base	A5W823

HMIS CODES

Health	1*
Flammability	0
Reactivity	0

MANUFACTURER'S NAME
THE SHERWIN-WILLIAMS COMPANY
101 Prospect Avenue N.W.
Cleveland, OH 44115

EMERGENCY TELEPHONE NO.
(216) 566-2917
INFORMATION TELEPHONE NO.
(216) 566-2902

Section 2 – Composition/Information on Ingredients

CAS Number Ingredient Name

Listed products may contain the following ingredients based upon color.
To obtain individual product MSDS or environmental data, call (216) 566-2902.

ConFlex XL High Build Coating

29911-28-2	1-(2-Butoxymethylethoxy)-propanol.
14808-60-7	Quartz
12001-26-2	Mica
13463-67-7	Titanium Dioxide.
1314-13-2	Zinc Oxide
107-21-1	Ethylene Glycol.
1332-58-7	Kaolin
14807-96-6	Talc
1333-86-4	Carbon Black.

ConFlex XL Texture High Build Coating

29911-28-2	1-(2-Butoxymethylethoxy)-propanol.
14808-60-7	Quartz
14464-46-1	Cristobalite
12001-26-2	Mica
93763-70-3	Perlite
13463-67-7	Titanium Dioxide.
1314-13-2	Zinc Oxide
107-21-1	Ethylene Glycol.
1332-58-7	Kaolin
14807-96-6	Talc
1333-86-4	Carbon Black.

-- Continued --

Section 2 – Composition/Information on Ingredients (continued)

% WT.	CAS No.	Ingredient Name				Vapor Pressure
max 2	29911-28-2	**1-(2-Butoxymethylethoxy)-propanol.**				
		ACGIH	TLV	Not Established		0.1 mm
		OSHA	PEL	Not Established		
max 9	14808-60-7	**Quartz**				
		ACGIH	TLV	0.05	mg/m3 as Respirable Dust	
		OSHA	PEL	0.05	mg/m3 as Respirable Dust	
max 1	14464-46-1	**Cristobalite**				
		ACGIH	TLV	0.05	mg/m3 as Respirable Dust	
		OSHA	PEL	0.05	mg/m3 as Respirable Dust	
max 5	12001-26-2	**Mica**				
		ACGIH	TLV	3	mg/m3 as Respirable Dust	
		OSHA	PEL	3	mg/m3 as Respirable Dust	
max 7	93763-70-3	**Perlite**				
		ACGIH	TLV	10	mg/m3 as Dust	
		OSHA	PEL	15	mg/m3 Total Dust	
		OSHA	PEL	5	mg/m3 Respirable Fraction	
max 14	13463-67-7	**Titanium Dioxide.**				
		ACGIH	TLV	10	mg/m3 as Dust	
		OSHA	PEL	10	mg/m3 Total Dust	
		OSHA	PEL	5	mg/m3 Respirable Fraction	
max 2	1314-13-2	**Zinc Oxide**				
		ACGIH	TLV	10	mg/m3 as Dust	
		OSHA	PEL	10	mg/m3 Total Dust	
		OSHA	PEL	5	mg/m3 Respirable Fraction	
<3% due to tinting	107-21-1	**Ethylene Glycol.**				
		ACGIH	TLV	50	CEILING	0.1 mm
		OSHA	PEL	50	CEILING	
<3% due to tinting	1332-58-7	**Kaolin**				
		ACGIH	TLV	2	mg/m3 as Respirable Dust	
		OSHA	PEL	10	mg/m3 Total Dust	
		OSHA	PEL	5	mg/m3 Respirable Fraction	
<3% due to tinting	14807-96-6	**Talc**				
		ACGIH	TLV	2	mg/m3 as Respirable Dust	
		OSHA	PEL	2	mg/m3 as Respirable Dust	
<1% due to tinting	1333-86-4	**Carbon Black.**				
		ACGIH	TLV	3.5	mg/m3	
		OSHA	PEL	3.5	mg/m3	

Section 3 – Hazards Identification

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.

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.

CANCER INFORMATION

For Complete Discussion of Toxicology Data Refer to Section 11.

- Continued -

Section 4 – First Aid Measures

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:	Do not induce vomiting. Get medical attention immediately.

Section 5 – Fire Fighting Measures

FLASH POINT	LEL	UEL
None	N.A.	N.A.

FLAMMABILITY CLASSIFICATION - 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 6 – Accidental Release Measures

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate and remove with inert absorbent.

Section 7 – Handling and Storage

DOL STORAGE CATEGORY - Not Applicable

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

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 8 – Exposure Controls/Personal Protection

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).

Removing or disturbing old paint from interior or exterior surfaces by sanding, scraping, abrading or other means may produce dust, debris or fumes that contain lead. Exposure to lead dust, debris or fumes may cause brain damage or other adverse health effects, especially in children and pregnant women. Structures built before 1978 should be tested by a licensed inspector prior to removing or disturbing old paint. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.

- Continued -

Section 8 – Exposure Controls/Personal Protection (continued)

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 – Physical and Chemical Properties

PRODUCT WEIGHT	9.8-11.3 lb/gal	EVAPORATION RATE	Slower than Ether
SPECIFIC GRAVITY	1.15-1.35	VAPOR DENSITY	Heavier than Air
BOILING POINT	212-449 °F	MELTING POINT	N.A.
VOLATILE VOLUME	46-55 %	SOLUBILITY IN WATER	N.A.
pH	9.0-9.5		

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical)
0.6-1.0 lb/gal Less Federally Exempt Solvents
0.3-0.5 lb/gal Emitted VOC

Section 10 – Stability and Reactivity

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 11 – Toxicological Information

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.
Rats exposed to titanium dioxide dust at 250 mg./m3 developed lung cancer, however, such exposure levels are not attainable in the workplace.
TOXICOLOGY DATA

CAS No.	Ingredient Name			
29911-28-2	**1-(2-Butoxymethylethoxy)-propanol.**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		Not Established
14808-60-7	**Quartz**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		Not Established

- Continued -

TOXICOLOGY DATA (continued)

CAS No.	Ingredient Name			
14464-46-1	**Cristobalite**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		Not Established
12001-26-2	**Mica**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		Not Established
93763-70-3	**Perlite**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		Not Established
13463-67-7	**Titanium Dioxide.**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		>7500 mg/kg
1314-13-2	**Zinc Oxide**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		Not Established
107-21-1	**Ethylene Glycol.**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		4700 mg/kg
1332-58-7	**Kaolin**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		Not Established
14807-96-6	**Talc**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		Not Established
1333-86-4	**Carbon Black.**			
	LC50	RAT	4HR	Not Established
	LD50	RAT		>15400 mg/kg

Section 12 – Ecological Information

ECOTOXICOLOGICAL INFORMATION
No data available.

Section 13 – Disposal Considerations

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/Provincial, and Local regulations regarding pollution.

Section 14 – Transport Information

DOT PROPER SHIPPING DESCRIPTION: Paint and Related Materials, NOIBN

IATA/IMDG SHIPPING DESCRIPTION: Paint and Related Materials, NOIBN

- Continued -

Section 15 – Regulatory Information

SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
	Zinc Compound.	max 2	max 1.2
107-21-1	Ethylene Glycol.	<3%	

CALIFORNIA PROPOSITION 65

WARNING: These products contain a chemical 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.

Section 16 – Other Information

CANADIAN DISTRIBUTOR: *Sherwin-Williams Canada*
180 Brunel Rd.
Mississauga, ON L4Z 1T5

NOTE: These products have been classified in accordance with the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR

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.

SINCE 1912
MORWEAR®
PAINT COMPANY

P R O D U C T   D A T A   S H E E T

Elastomeric Waterproofing, Clear *2571-70*

GENERAL INFORMATION

Product Description
Clear Elastomeric Waterproofing is a clear, flat penetrating elastomeric rubber latex coating having tenacious mechanical and physical properties. It employs a superior new technology to waterproof and protect concrete, wood and masonry substrates, in particular, split-face blocks. It is designed for application over exterior or interior, new or old, above grade, dense or porous concrete, stucco, and masonry surfaces. It protects against the damaging effects of water, de-icing chemicals, freeze-thaw, and acid rain exposure. It accommodates surface movements without altering or changing the surface appearance or texture. It may be tinted with water based colorants and can be added to latex paint or stain.

Performance Characteristics
- Suitable for both damp or dry surfaces
- Breathable and permeable to water vapor
- May be applied over substrates previously treated with silanes, siloxanes, urethanes and acrylics
- Paintable with latex or oil base paints
- Excellent elongation: 440%
- Excellent tensile strength: 400 psi.
- Excellent exterior durability
- Excellent water resistance
- Low VOC, low odor

Surface Preparation
The surface should be inspected to identify repairs or improvements necessary before application. All mortar joints should be sealed and joints and cracks larger than hairlines should be filled with a suitable patching material. All preparation, painting, caulking of joints or cracks should be allowed to cure fully prior to application. Alkali, lime, or efflorescence on the surface should be treated or cleaned with a proper neutralizing agent prior to application of the coating. The surface must be clean, dry and free from dirt, wax, grease, oil, chalk, mildew and scaling materials.

Painted Surfaces
If paint is blistering, remove by abrasive blasting. If the painted surface is in an acceptable and reliable condition, then clean surface with a caustic soda solution 10% diluted with water to enable the coating to bond to the surface. When using caustic soda or acidic solutions on the surface, hose thoroughly with water and allow to dry before applying coating.

Concrete Surfaces
Surfaces must be cured at least 30 days and cleaned. For best results, acid-etch with muriatic acid diluted less than 10% with water. Scrub the surface using a stiff brush and allow to stand for 10 minutes on the surface. Hose the surface thoroughly with water.

Application Suggestions
STIR WELL BEFORE USING. Some separation may occur, but it will have no detrimental effect on the performance of the material. Apply by brush, roller, airless spray, or immersion. When spraying, follow spray equipment manufacturer's recommendations carefully. On vertical surfaces, apply Elastomeric Waterproofing from bottom to top using a garden sprayer or airless with 421 Contractor Spray tip, not to exceed 500 psi. May also be applied using a paint pad, foam roller, brush or natural bristle brush. Work small sections at a time. Always apply to a small, inconspicuous test area first to ensure penetration and proper results. Apply in a single, liberal, saturating application so that the surface remains wet for a few seconds before penetrating. Surface pools or puddles should be removed by back-rolling or brooming until Elastomeric Waterproofing completely penetrates the surface. Failure to do so may result in blotching and/or a glistening appearance. Be sure that new wood has aged, particularly when working with redwood, pine, or cedar, as those woods may take 6 to 12 months to suitably dry. Elastomeric Waterproofing will not stop tannic acids from bleeding or the natural discoloration process (silvery-gray) in wood, but continues to waterproof the wood.
Because this product is a penetrating sealer, it can be painted with oil or water based paints or stains. Allow the surface to dry for at least 7 to 14 days prior to painting.
Apply only when the temperature of the surface, material and air is above 50°F. Exterior applications must be protected from rain for at least 4 to 5 hours after application.

HEALTH & SAFETY INFORMATION

CAUTION!

Do not take internally. Use only with adequate ventilation. Avoid breathing vapor, spray mist or sanding dust. Sanding dust may cause eye and skin irritation. Avoid contact with eyes. Avoid prolonged or repeated contact with skin.

This product contains chemical(s) known to the State of California to cause cancer and birth defects or other reproductive harm (Prop. 65).

Environmental Considerations

Formulated without lead, mercury or chromium.

Disposal Information

Dispose in accordance with all Federal, State and Local regulations. Please use all of the paint before disposing of the container. If no paint can be poured or drained from the container, dispose of the dry, empty container as you would normal household waste. Store any excess product in a tightly sealed container away from heat or flames. To dispose of a full or partially full container of paint, contact your city or county government for hazardous materials collection locations and operating hours. Do not dispose of excess paint in any sanitary or storm water sewer system.

TECHNICAL INFORMATION

APPLICATION EQUIPMENT

Brush Type:	Polyester, Nylon, foam
Roller Cover:	Synthetic or foam rubber
Nap size:	
Medium Texture	3/8" – 1/2" nap
Spray Equipment:	Heavy-duty piston 500 PSI maximum
Spray Tip Size:	421 Contractor Spray Tip
P.S.I.:	500
Filter:	60 mesh

VISCOSITY: 125 centipoise

THINNING: Apply at package consistency. DO NOT THIN

DRY TIME: Dries to the touch and may be walked on in 1 to 2 hours depending on surface texture, porosity, temperature and humidity. Sets up an initial barrier in 24 hours. Allow 72 hours before exposing to water under pressure or motor vehicle traffic. Allow to cure for at least one week before exposing to water test.

CLEAN-UP: Clean brushes, rollers and equipment with soap and water. Clean spills and spatter immediately.

COVERAGE: One coat application will have the following spread rates (ft^2/gal). Spread rates will vary considerably due to the porosity of the substrate.

Split Face Block	80-100
Regular Block	100-120
Rough Concrete	120-140
Smooth Concrete	140-160
Stucco	130-140
Exterior Brick	120-140
Aggregate	150-170
Smooth Stone	150-170
Fencing	130-150
Lumber	175-200
Decking	130-140
Shakes/Shingles	130-140

TECHNICAL SPECIFICATIONS

FLASH POINT:	None
SOLIDS BY WEIGHT:	15%
Density	9.16
Moisture Vapor (ASTM E96)	Excellent
Perm Rating	14.2
Water Permeance (ASTM E514-86)	99%
Shore A Hardness	40
Tensile Strength (ASTM 412)	400 psi
Elongation (ASTM 412)	440%
Maximum Service Temperature	450°F

EQUIVALENT FEDERAL SPECIFICATIONS: None

Revised 3/2/01

PRODUCT NAME: CLEAR, ELASTOMERIC WATERPROOFING HMIS CODES: H F R P
PRODUCT CODE: 2571-70 2*0 0 B

SECTION I - MANUFACTURER IDENTIFICATION

MANUFACTURED FOR : SMILAND PAINT COMPANY
ADDRESS : 620 LAMAR STREET
LOS ANGELES, CA. 90031-2513

EMERGENCY PHONE : (800) 535-5053
INFORMATION PHONE : (323) 222-7616
SUPERSEDES DATE :

DATE PRINTED : 01/06/94
NAME OF PREPARER :
REVISION DATE : January 6, 1994

SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION

REPORTABLE COMPONENTS	CAS NUMBER	VAPOR PRESSURE mm Hg	@ TEMP	WEIGHT PERCENT
SILICA, AMORPHOUS	7631-86-9	N/A	N/A	3.1

OSHA TWA: 6mg/m3; ACGIH TWA: 10mg/m3 AS DUST

*** No 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: 212-225 F
VAPOR DENSITY: Lighter than air.
COATING V.O.C.: 30 g/l
SPECIFIC GRAVITY (H2O=1): 1.24
EVAPORATION RATE: Slower than ether.
MATERIAL V.O.C.: 30 g/l
SOLUBILITY IN WATER: Complete.
APPEARANCE AND ODOR: Typical for water based paints.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: Not Applicable.
METHOD USED: Not Applicable.

FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: .62 UPPER: 15.3

EXTINGUISHING MEDIA: Foam, CO2, Dry Chemical, or Water Fog.

SPECIAL FIREFIGHTING PROCEDURES
Cool containers with water spray. Firefighters should wear full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Closed container exposed to high temperatures may explode or burst due to build up of steam pressure.

SECTION V - REACTIVITY DATA

STABILITY: Stable.
CONDITIONS TO AVOID
Excessive heat.

INCOMPATIBILITY (MATERIALS TO AVOID)
Avoid contact with strong oxidizing agents and acids.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS

May form toxic materials on thermal decomposition including Carbon Dioxide, Carbon Monoxide, and various hydrocarbons, alkaline liquid, SiO2 and NaOH.

HAZARDOUS POLYMERIZATION: Will not occur.

==================== SECTION VI - HEALTH HAZARD DATA ======================

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Adverse health effects from vapors or spray mists in poorly ventilated areas may include irritation of the mucous membranes of the nose, throat, and respiratory tract and symptoms of headache and nausea.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
EYES: In direct contact, may cause irritation. SKIN: Prolonged and repeated contact with product may cause skin irritation.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Redness, drying of the skin, or other signs of irritation or contact dermatitis.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Can cause gastrointestinal irritation, nausea, vomiting, and diarrhea.

HEALTH HAZARDS (ACUTE AND CHRONIC)
ACUTE: May cause irritation to skin and eyes, gastrointestinal irritation, nausea, and vomiting. CHRONIC: Prolonged or repeated exposure above TLV may result in permanent brain and nervous system damage.

CARCINOGENICITY: NTP CARCINOGEN: No IARC MONOGRAPHS: No OSHA REGULATED: No

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
May be aggravating to some skin and respiratory conditions, and to pre-existing liver and/or kidney disorders.

EMERGENCY AND FIRST AID PROCEDURES
EYES: Flush with large amounts of water for at least 15 minutes. Take to a physician. SKIN: Wash affected areas with soap and water. Remove contaminated clothing. If irritation persists, consult physician. INHALATION: Remove to fresh air. Treat symptomatically. Consult physician. INGESTION: Drink 1 or 2 glasses of water to dilute. DO NOT INDUCE VOMITING. CONSULT A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY. TREAT SYMPTOMATICALLY.

=========== SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE ============

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Dike, contain, or absorb with inert materials. Transfer to containers for recovery or disposal. Prevent runoff into sewers, streams, or other bodies of water.

WASTE DISPOSAL METHOD
Dispose of in accordance with all local, state and federal regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Do not expose to extremes in temperature. Avoid exposure to high temperatures. DO NOT ALLOW TO FREEZE.

OTHER PRECAUTIONS
DO NOT TAKE INTERNALLY. Avoid prolonged or repeated exposure to levels above TLV. KEEP OUT OF REACH OF CHILDREN.

==================== SECTION VIII - CONTROL MEASURES =====================

RESPIRATORY PROTECTION
Not normally required. If TLV is exceeded, use NIOSH/MSHA approved organic

vapor and mist, supplied air, or self-contained breathing apparatus. Avoid breathing sanding dust.

VENTILATION
Use adequate mechanical (general and/or local) ventilation to maintain exposure below TLV.

PROTECTIVE GLOVES
Wear resistant gloves such as polyethylene.

EYE PROTECTION
Use chemical splash goggles or OSHA permitted safety glasses.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT
Wear impervious clothing. Eye wash station.

WORK/HYGIENIC PRACTICES
Wash hands before eating or using restrooms. Remove and wash all contaminated clothing before reuse.

========================= SECTION IX - DISCLAIMER ==========================

The information contained herein is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees.

TK-1311 WB SILANE CONCENTRATE

Meets Federal EPA's VOC Requirements

TK PRODUCTS

Division of Sierra Corporation

Technical Data

TK-1311 WB SILANE CONCENTRATE
Water Repellent Concrete Sealer

PRODUCTS 3 & 7

1. PRODUCT NAME
TK-1311 WATER BASED SILANE CONCENTRATE CONCRETE SEALER

2. MANUFACTURER
TK PRODUCTS, DIVISION OF SIERRA CORPORATION
11400 West 47th Street
Minnetonka, MN 55343
952-938-7223
952-938-8084 (FAX)
e-mail: tkproduct@AOL.com
Website: http://www.tkproduct.com

3. PRODUCT DESCRIPTION

TK-1311 is a silicone micro emulsion concentrate based on silane and oligomeric alkoxysilanes, which when mixed with water, produce micro emulsions. In diluted form it is used to seal and impart water repellency to absorbent mineral building materials.

4. TECHNICAL DATA

TK-1311 has been tested by Wacker Silicones Corporation laboratory according to the NCHRP 244 test procedures. The Series II cube test results are as follows:

TK-1311	
Percent	10
SFPG	200
% Reduction	83.2

-A.I.M. Category - Waterproofing Sealer and Treatment - maximum VOC 600 g/l.
-A.I.M. Definition: TK-1311 WB Silane Concentrate is a coating formulated and recommended for application to a porous substrate for the primary purpose of preventing the penetration of water.

5. APPLICATION PROCEDURES AND INSTRUCTIONS

Preparation:
Substrate to be sealed should be clean and dry.

Application:
Prepare emulsion by adding 5 gallons TK-1311 to 45 gallons water in open head agitator drum. Stir for 2 to 3 minutes.

TK-1311 diluted with water should be used on the day on which it has been diluted

Coverage:
TK-1311 should be applied uniformly at the rate of 150 square feet per gallon. Coverage rates will vary with surface texture, porosity, weather conditions, etc. A test panel mock-up should be applied prior to project start-up to determine coverage rates and appearance.

Limitations:
- Do not apply to wet or frozen substrates.
- Do not apply when ambient air temperature is below 40°F.
- Do not apply when rain or snow are forecast or expected.

First Aid:
Ingestion: If swallowed, give several glasses of water, but do not induce vomiting. If vomiting does occur, give fluids again; call physician immediately.
Eye Contact: Do not rub, flush with clean water for 15 minutes. **Skin Contact:** Remove by washing thoroughly with soap and water. If eye or skin irritation continues, obtain medical assistance.

6. AVAILABILITY AND PACKAGING

TK-1311 is packaged in 5 and 1 gallon containers.

7. LIMITED WARRANTY

TK Products, a division of The Sierra Corporation, warrants that its products conform to their label descriptions, are free from manufacturing defects, and are fit for the ordinary purposes for which such goods are used. Inasmuch as the use of its products by others and other factors affecting product performance are beyond TK Products' control, TK Products does not guarantee the results to be obtained. SHOULD ANY OF ITS PRODUCTS FAIL TO GIVE SATISFACTORY RESULTS, TK PRODUCTS WILL REPLACE THE PRODUCTS OR, AT ITS OPTION, REFUND THE PURCHASE PRICE. THIS IS THE SOLE AND EXCLUSIVE REMEDY FOR ANY FAILURE OF THE PRODUCTS OF TK PRODUCTS TO PERFORM AS WARRANTED AND SHALL ALSO CONSTITUTE LIQUIDATED DAMAGES IN CASE OF LOSS. UNDER NO CIRCUMSTANCES SHALL THE BUYER BE ENTITLED TO ANY OTHER REMEDY OR DAMAGES. REMEDIES FOR INCIDENTAL AND CONSEQUENTIAL DAMAGES ARE SPECIFICALLY EXCLUDED. TK Products does not authorize any person to assume for it any other liability in connection with the sale or use of its products unless specifically authorized by TK Products in writing. See also TK PRODUCTS DISCLAIMER section below.

8. TECHNICAL SERVICES

The TK office offers assistance with specifications, performance test data and field services.

9. FILING SYSTEMS
Information Handling Services:
PO Box 1213
Englewood, CO 80150
Information Marketing Services:
13271 Northend
Oak Park, MI 48237

TK DISCLAIMER

Every effort has been made to ensure the accuracy of the above information and to avoid infringement of any patent or copyright. The information is based on field tests by government and private agencies, as well as lab tests, and on technical data from raw material manufacturers. The person(s) specifying or requesting the use of these products is responsible for assuring their suitability for a specific use, as well as the proper application of the products. Where there is any question as to the suitability of a particular product, a small test patch is recommended. See also LIMITED WARRANTY above.

FOR INDUSTRIAL USE ONLY

PRODUCTS 3 & 7

TK-1311 WB SILANE CONCENTRATE
Water Repellent Concrete Sealer

9/99

M A T E R I A L   S A F E T Y   D A T A   S H E E T

NUFACTURER: SIERRA CORP/TK PRODUCTS
DDRESS : 11400 WEST 47TH STREET
MINNETONKA, MN 55343
EMERGENCY PHONE: 1-800-424-9300
INFORMATION PHONE: (952)938-7223

DATE PRINTED : 01/22/2003 NAME OF PREPARER : Safety Director

====================== SECTION 1 - PRODUCT IDENTIFICATION ======================

PRODUCT NAME: SILANE, WB CONCRETE SEALER **HMIS CODES: H F R P**
PRODUCT CODE: TK-1311 WB 2*3 1 H

============== SECTION 2 - COMPOSITION/INGREDIENT INFORMATION ================

COMPONENT	CAS NUMBER	WEIGHT PERCENT	EXPOSURE LIMITS OSHA PEL	ACGIH TLV	OTHER
ISOOCTYLTRIMETHOXYSILANE	34396-03-7	40 - 50	NOT ESTABLISHED		
ETHYL SILICATE	78-10-4	20 - 30	10 PPM	10 PPM	
OLIGOMERIC ALKYLALKOXYSILOXANE	PMN 84-811	10-20	NOT ESTABLISHED		
* GLACIAL ACETIC ACID	64-19-7	1-10	UNKNOWN	10 PPM	STEL 15

* Chemical(s) that are chronic health hazards. Refer to section 3 for further information.

================== SECTION 3 - HEALTH HAZARDS IDENTIFICATION ===================

PRIMARY ROUTES OF EXPOSURE:
Skin contact, eye contact, and inhalation.

EFFECTS OF ACUTE EXPOSURE:
ES: Contact with eyes may cause irritation including burning, watering, and redness.
SKIN: Contact may cause mild skin irritation including redness, burning, and drying and cracking of skin. Continued expo may develop into dermatitis. Solvents can penetrate the skin and cause systematic effects similar to those under inhalation symptoms.
INHALATION: High vapor concentrations are irritating to the eyes and respiratory tract, may cause headaches, dizziness, anesthesia, asthma, drowsiness, unconsciousness, and other central nervous system effects, and possibly death.
INGESTION: Can cause gastrointestinal irritation, nausea, vomitting and diarrhea. Small amounts aspirated into the respiratory system during ingestion or vomiting may cause mild to severe pulmonary injury.

CHRONIC HEALTH EFFECTS:
Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage (Sometimes referred to as Solvent or Painter's Syndrome). Intentional misuse by deliberately concentrating and inhaling this material may be harmful or fatal. Chronic exposure may also cause damage to the respiratory system, lungs, eyes, skin, gastrointestinal tract, liver, spleen and kidneys. Repeated skin contact may cause persistant irritation or dermatitis.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:
Conditions aggrevated by exposure may include skin disorders, respiratory (asthma-like) disorders, and pre-existing liver or kidney conditions.

======================= SECTION 4 - FIRST AID MEASURES =====================

IF ON SKIN: Thoroughly wash exposed area with soap and water. Remove contaminated clothing. Launder contaminated clothing before re-use. If irritation develops and persists, seek medical attention.
IF IN EYES: Flush with large amounts of water for 15 minutes, lifting upper and lower lids occasionally. If symptoms persist, seek medical attention.
If SWALLOWED: Do not induce vomiting. Keep person warm, quiet and seek immediate medical attention. Aspiration of material into lungs can cause severe lung damage. VOMITING CAN CAUSE CHEMICAL PNEUMONITIS WHICH CAN BE FATAL.
INHALATION: Move affected individual to fresh air. If breathing is difficult, qualified personnel should administer oxygen. If breathing has stopped give artificial respiration. If respiratory symptoms develop or persist, seek medical attention.

================ SECTION 5 - FIRE AND EXPLOSION HAZARD DATA ==================

ЗH POINT: 69 F   METHOD USED: TCC

⁄MMABLE LIMITS IN AIR BY VOLUME- LOWER: 6.6   UPPER: 19.3

EXTINGUISHING MEDIA:

Foam, CO2, or dry chemical is recommended. Water spray is recommended to cool or protect exposed materials or structures.

SPECIAL FIREFIGHTING PROCEDURES:

Persons exposed to products of combustion should wear self-contained breathing apparatus and full protective equipment. Isolate danger area, keep unauthorized personnel out. Water may be ineffecive for extinguishment, unless used under favorable conditions by experienced fire fighters. Carbon dioxide can displace oxygen, exercise caution when using CO2 in confined areas.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Vapors may be ignited by heat, sparks, flames, or other sources of ignition. Vapors are heavier than air and may travel considerable distances to a source of ignition where they may cause a flashback or explosion. If container is not properly cooled, it can rupture in the presence of excessive heat.

================== SECTION 6 - ACCIDENTAL RELEASE MEASURES =====================

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

Keep all sources of ignition and hot metal surfaces away from spill/release. Use explosion-proof non-sparking equipment. Stay upwind from area. Isolate danger and keep unauthorized personnel out. Stop source of release if possible with minimal risk. Wear appropriate protective equipment including respiratory protection. Prevent spill from entering sewers, storm drains, or any other unauthorized treatment drainage systems and natural waterways by diking ahead of the spill. Spilled material may be absorbed with an appropriate spill kit. Notify fire authorities and appropriate federal, state, and local agencies if required.

==================== SECTION 7 - HANDLING AND STORAGE ========================

HANDLING INFORMATION:

Employees who come in contact with this material must be trained in accordance to 1910.1200 of the Hazard Communication Standard.

en container slowly to relieve any pressure. Bond and ground all equipment when transferring from one vessel to ›ther. Static charge can accumulate by flow or agitation. Ignition can occur by static discharage. The use of ⁄plosion proof equipment is recommended and may be required. The use of respiratory protection is advised when concentrations exceed any established exposure limits and in confined spaces. Use good industrial and personal hygiene practice, wash thoroughly after handling, and do not wear contaminated clothing.

STORAGE INFORMATION:

Keep containers tightly closed. Use and store material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Post "No smoking or open flame" sign. Store only in approved containers. Keep away from incompatible materials (see section 10). Protect containers against physical damage. Indoor storage should meet OSHA standards and appropriate fire codes.

OTHER PRECAUTIONS:

"Empty" containers retain residue, liquid and vapor, and may be dangerous. Do not cut, weld, pressurize, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may expode and cause severe personal injury or death. All containers should be disposed of in an environmentally safe manner in accordance with all government regulations.

================ SECTION 8 - CONTROL MEASURES/PERSONAL PROTECTION ==============

RESPIRATORY PROTECTION:

Engineering or administrative controls should be implemented to reduce exposure. A NIOSH/MSHA approved respirator with an organic vapor cartridge should be used under conditions where airborne concentrations are expected to exceed exposure limits (See Section 2). Use a positive pressure air supplied respirator if there is potential for uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.

VENTILATION:

If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used.

PROTECTIVE GLOVES:

˜event prolonged or repeated contact by wearing gloves impervious to solvents and other appropriate protective ›thing. Launder contaminated clothing before reuse.

.E PROTECTION:

Wear safety glasses to reduce eye contact potential. Chemical safety goggles (ANSI Z87.1 or approved equivalent) are

:opriate if splashing is likely. Eye washes must be available where eye contact can occur.

.ER PROTECTIVE CLOTHING OR EQUIPMENT:

A source of clean water should be available for flushing eyes and skin. Showers should be available if larger spills are possible.

WORK/HYGIENIC PRACTICES:

Efforts should be made to minimize contact and spills. Always wash hands before eating, drinking, or smoking. Clean up spills promptly. Follow OSHA and company guidlines.

==================== SECTION 9 - PHYSICAL/CHEMICAL PROPERTIES ==================

PHYSICAL STATE: Liquid
ODOR: Hydrocarbon odor
SPECIFIC GRAVITY (H2O=1): 1.
BOILING RANGE: 244 deg F
% VOLATILE BY WT: 6.%
% VOLATILE BY VOLUME: 6.02%
COLOR: Amber/Transluscent
SOLUBILITY IN WATER: Soluble
VAPOR DENSITY: Heavier than air.
EVAPORATION RATE: Faster than nBuAc
COATING V.O.C.: 59 g/l (.5 lb/gl)

====================== SECTION 10 - STABILITY/REACTIVITY DATA =================

STABILITY:

Stable under normal conditions and handling.

CONDITIONS TO AVOID:

All possible sources of ignition.

INCOMPATIBILITY (MATERIALS TO AVOID):

Avoid exposure to strong oxidizing agents and reducing agents.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS:

Combustion may liberate toxic byproducts such as carbon dioxide, carbon monoxide, various oxides of carbon and nitrogen.

HAZARDOUS POLYMERIZATION:

Will not occur.

====================== SECTION 11 - TOXICOLOGICAL INFORMATION =================

SENSITIZATION:

None known.

RCINOGENICITY:

.ere is no data available to indicate any components present at greater than 0.1% may present a carcinogenic hazard.

REPRODUCTIVE TOXICITY:

There is no data available to indicate any components present at greater than 0.1% may present reproductive toxicity.

TERATOGENICITY (BIRTH DEFECTS):

There is no data available to indicate any components present at greater than 0.1% may cause birth defects.

MUTAGENICITY:

There is no data to indicate that any component present at greater than 0.1% will alter DNA.

======================= SECTION 12 - ECOLOGICAL INFORMATION ===================

ENVIRONMENTAL DATA:

Although no information is available for this specific product mixture, individual components may by themselves may have ecological affects.

======================= SECTION 13 - DISPOSAL CONSIDERATIONS ==================

This product is considered a RCRA hazardous waste due to the characterisic(s) of D001 and D018. Waste is subject to the land disposal restrictions in 40 CFR 268.40 and may require treatment standards. Consult state and local regulations to determine whether they are more stringent than the federal requirements.

Container contents should be completely used and containers empty prior to discarding. Container rinsate could be considered a RCRA hazardous waste and must be discarded in compliance with all applicable regulations. Larger empty containers, such as drums, should be returned to a professional drum reconditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities.

======================= SECTION 14 - REGULATORY INFORMATION ===============

SHIPPING NAME:

Flammable Liquid, N.O.S., 3, (Ethyl silicate, alkyltrialkoxysilane), UN 1993PACKING GROUP: II

All ingredients of this product are listed, or are excluded from listing, on the US Toxic Subatances Control Act (TSCA) chemical substance inventory.

.is product does not contain a chemical subject to the reporting requirements of SARA Title III, Section 313 (40CFR 372) above de minimis concentrations.

.TE SPECIFIC REQUIREMENTS:
This product does not contain a chemical known to the state of California to cause cancer, birth defects or reproductive harm, subject to the requirements of California Proposition 65.

STATE LISTED COMPONENTS	CAS NUMBER	STATE CODE
Ethyl silicate	78-10-4	MA, PA, NJ
Acetic Acid	64-19-7	CA,CT,FL,IL,LA,MA,ME,MN,NJ,PA,RI

================================ DISCLAIMER ================================

The information contianed within this MSDS was obtained from sources which we believe are reliable. However, the information is provided without any representation or warranty, expressed or implied, regarding it's accuracy or correctness. We do not assume responsibility for loss, damage or expense arising from storage, use, or disposal of this product.

A P P E N D I X B

SUMMARY TABLES OF COATING CHARACTERISTICS

APPENDIX C

RISK ASSESSMENT METHODOLOGIES

METHODOLOGIES FOR RISK ASSESSMENT

The following presents the methodologies the SCAQMD used to estimate the toxic risks associated with the implementation of PAR 1113. The reader referred to the attached spreadsheets for the variables and assumptions used in these methodologies. The reader is also referred to the SCAQMD's Risk Assessment Procedures for Rules 1401 and 212 (November 1998) for a more detailed discussion of risk assessment procedures.

Health risk assessment is used to estimate the likelihood that an individual would contract cancer or experience other adverse health effects as a result of exposure to toxic air contaminants. Risk assessment is a methodology for estimating the probability or likelihood that an adverse health effect will occur. The risk assessment procedures for PAR 1401 are consistent with current recommendations by Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA). OEHHA is the state agency with primary responsibility for developing and recommending risk assessment methods

Carcinogenic Analysis

The equation for calculating MICR is:

$$\mathrm{MICR} = \mathrm{Qyr} \times \mathrm{U} \times \left(\frac{\mathrm{X}}{\mathrm{Q}}\right) \times \mathrm{MET} \times \mathrm{MP} \times \mathrm{LEA}$$

$$\mathrm{Qyr} = \text{Amount of Toxic Emissions}, \frac{\text{tons}}{\text{yr}}$$

$$\mathrm{U} = \text{Toxic Unit Risk Factor}, \left(\frac{\mu\mathrm{g}}{\mathrm{m}^3}\right)^{-1}$$

$$\left(\frac{\mathrm{X}}{\mathrm{Q}}\right) = \text{Dispersion Factor}, \left(\frac{\mu\mathrm{g}}{\mathrm{m}^3} \Big/ \frac{\text{tons}}{\text{yr}}\right)$$

$$\mathrm{MET} = \text{Metrological Correction Factor}$$

$$\mathrm{MP} = \text{Multi - Pathway Adjustment Factor}$$

$$\mathrm{LEA} = \text{Life Time Exposure Adjustment Factor}$$

Knowing that the SCAQMD significance threshold for toxics is MICR $>10\mathrm{x}10^{-6}$, the following equation is used to estimate the yearly toxic emissions that would have to be emitted to exceed this threshold.

$$\mathrm{Qyr} = \frac{\mathrm{MICR}}{\mathrm{U} \times \left(\frac{\mathrm{X}}{\mathrm{Q}}\right) \times \mathrm{MET} \times \mathrm{MP} \times \mathrm{LEA}}$$

To calculate the amount of daily toxic emissions that would have to be emitted to exceed a MICR >10x10^{-6}, the following equation is used.

$$\text{Qday}, \frac{\text{lbs}}{\text{day}} = \frac{\text{Qyr}}{\text{Days}} \times \frac{2000\,\text{lbs}}{\text{ton}}$$

$$\text{Qyr} = \text{Amount of Toxic Emissions}, \frac{\text{tons}}{\text{yr}}$$

$$\text{Days} = \text{Coating Application}, \frac{\text{days}}{\text{yr}}$$

Knowing the daily toxic emissions, the daily coating usage necessary to exceed a MICR >10x10^{-6} can be estimated using the following equation.

$$\text{Usage}, \frac{\text{gal}}{\text{day}} = \frac{\text{Qday}}{\text{Density} \times \left(\frac{\%\text{Tox}}{100}\right)}$$

$$\text{Qday} = \text{Amount of Toxic Emissions}, \frac{\text{lbs}}{\text{day}}$$

$$\text{Density} = \text{Density of Coating}, \frac{\text{lbs}}{\text{gal}}$$

$$\%\text{Tox} = \text{Percentage of Toxic Compound in Coating}, \%$$

Chronic Analysis

The equation for calculating HIC is:

$$\text{HIC} = \frac{\text{Qyr} \times \left(\frac{\text{X}}{\text{Q}}\right) \times \text{MET} \times \text{MP}}{\text{REL}}$$

$$\text{Qyr} = \text{Amount of Toxic Emissions}, \frac{\text{tons}}{\text{yr}}$$

$$\left(\frac{\text{X}}{\text{Q}}\right) = \text{Dispersion Factor}, \left(\frac{\mu\text{g}}{\text{m}^3} \Big/ \frac{\text{tons}}{\text{yr}} \right)$$

$$\text{MET} = \text{Metrological Correction Factor}$$

$$\text{MP} = \text{Multi - Pathway Adjustment Factor}$$

$$\text{REL} = \text{Re ference Expsoure Level}$$

Knowing that the SCAQMD significance threshold for toxics is HI >1, the following equation is used to estimate the yearly toxic emissions that would have to be emitted to exceed this threshold.

$$\text{Qyr} = \frac{\text{HIC} \times \text{REL}}{\left(\frac{\text{X}}{\text{Q}}\right) \times \text{MET} \times \text{MP}}$$

To calculate the amount of daily toxic emissions that would have to be emitted to exceed a HI >1, the following equation is used.

$$\text{Qday}, \frac{\text{lbs}}{\text{day}} = \frac{\text{Qyr}}{\text{Days}} \times \frac{2000\ \text{lbs}}{\text{ton}}$$

$$\text{Qyr} = \text{Amount of Toxic Emitted}, \frac{\text{tons}}{\text{yr}}$$

$$\text{Days} = \text{Coating Application}, \frac{\text{days}}{\text{yr}}$$

Knowing the daily toxic emissions, the daily coating usage necessary to exceed a HI >1 can be estimated using the following equation.

$$\text{Usage}, \frac{\text{gal}}{\text{day}} = \frac{\text{Qday}}{\text{Density} \times \left(\frac{\%\text{Tox}}{100}\right)}$$

$$\text{Qday} = \text{Amount of Toxics Emitted}, \frac{\text{lbs}}{\text{day}}$$

$$\text{Density} = \text{Density of Coating}, \frac{\text{lbs}}{\text{gal}}$$

$$\%\text{Tox} = \text{Percentage of Toxic Compound in Coating}, \%$$

Acute Analysis

The equation for calculating HIA is:

$$HIC = \frac{Qhr \times \left(\frac{X}{Q}\right)_{max}}{REL}$$

$$Qhr = \text{Amount of Toxic Emitted}, \frac{lbs}{hr}$$

$$\left(\frac{X}{Q}\right)_{max} = \text{Dispersion Factor}, \left(\frac{\mu g}{m^3} \Big/ \frac{tons}{yr}\right)$$

$$REL = \text{Re ference Expsoure Level}$$

Knowing that the SCAQMD significance threshold for toxics is HI > 1, the following equation is used to estimate the hourly toxic emissions that would have to be emitted to exceed this threshold.

$$Qhr = \frac{HI \times REL}{\left(\frac{X}{Q}\right)_{max}}$$

Knowing the hourly toxic emissions, the daily coating usage necessary to exceed a HIA > 1 can be estimated using the following equation.

$$\text{Usage}, \frac{gal}{day} = \frac{Qhr \times Hours}{Density \times \left(\frac{\%Tox}{100}\right)}$$

$$Qhr = \text{Amount of Toxic}, \frac{lbs}{hrs}$$

$$Hours = \text{Coating Application}, \frac{hrs}{day}$$

$$Density = \text{Density of Coating}, \frac{lbs}{gal}$$

$$\%Tox = \text{Percentage of Toxic Compound in Coating}, \%$$

Real-Case Analysis

Compound	% by wt.	Unit Risk Factor 1/(ug/m3)	Chronic REL ug/m3	Acute REL ug/m3	MICR MP	Chronic MP	Target Organs
Toluene	10		3.00E+02	3.70E+04		1	CNS/PNS, Repr
Xylene	10		7.00E+02	2.20E+03		1	Repr, Resp
Isopropyl Alcohol	4		7.00E+03	3.20E+03		1	CV/BL, CNS/PNS, Immun
Ethylene Glycol	6		4.00E+02			1	Resp, Skin, Kidn, Repr
Propylene Glycol	5		7.00E+03			1	Liver
EGEE	10		7.00E+01	3.70E+02		1	Repr, CV/BL
EGME	10		6.00E+01	9.30E+01		1	Repr
EGBE	5			1.40E+04		1	CV/BL
Methyl Ethyl Ketone	10			1.30E+04			Repr
Toluene Diisocyanate (TDI)	1	1.10E-05	7.00E-02		1	1	Resp
Methylene Phenyl Diisocyanate	1		7.00E-01			1	Resp
Styrene	1		9.00E+02	2.10E+04		1	Eye, Resp

Assumptions

Coating	Density	9	lbs/gal
	hrs/day	8	
	days/yr	260	
	Stack Ht	Ground Level	
	Receptor	Residential	
	Location	West LA	
Signficance Threshold for	MICR	1.00E-05	
Signficance Threshold for	HIC	1	
Signficance Threshold for	HIA	1	

Input Variables (Point Source)

Distance to Receptor meters	X/Q ug/m3 / tons/yr	MET	LEA	X/Q max ug/m3 /lb/hr
25	51.18	1	1	2000
50	16.88	1	1	1000.6
100	4.51	1	1	373.5

Carcinogenic Analysis (MICR)

		25m			**50m**			**100m**	
Compound	QYR tons/yr	QDAY lbs/day	Usage gals/day	QYR tons/yr	QDAY lbs/day	Usage gals/day	QYR tons/yr	QDAY lbs/day	Usage gals/day
Toluene Diisocyante (TDI)	0.02	0.14	1.52	0.05	0.41	4.60	0.20	1.55	17.23

Chronic Exposure Analysis (HIC)

	25m			50m			100m		
Compound	QYR tons/yr	QDAY lbs/day	Usage gals/day	QYR tons/yr	QDAY lbs/day	Usage gals/day	QYR tons/yr	QDAY lbs/day	Usage gals/day
Toluene	5.86	45.09	50.10	17.77	136.71	151.90	66.52	511.68	568.54
Xylene	13.68	105.21	116.90	41.47	318.99	354.44	155.21	1193.93	1326.59
Isopropyl Alcohol	136.77	1052.09	2922.48	414.69	3189.94	8860.94	1552.11	11939.28	33164.67
Ethylene Glycol	7.82	60.12	111.33	23.70	182.28	337.56	88.69	682.24	1263.42
Propylene Glycol	136.77	1052.09	2337.99	414.69	3189.94	7088.75	1552.11	11939.28	26531.73
EGEE	1.37	10.52	11.69	4.15	31.90	35.44	15.52	119.39	132.66
EGME	1.17	9.02	10.02	3.55	27.34	30.38	13.30	102.34	113.71
Toluene Diisocyante (TDI)	0.00	0.01	0.12	0.00	0.03	0.35	0.02	0.12	1.33
Methylene Phenyl Diisocyanate	0.01	0.11	1.17	0.04	0.32	3.54	0.16	1.19	13.27
Styrene	17.58	135.27	1502.99	53.32	410.13	4557.05	199.56	1535.05	17056.11

Acute Exposure Analysis (HIA)

	25m		50m		100m	
Compound	QHR lbs/hr	Usage gals/day	QHR lbs/hr	Usage gals/day	QHR lbs/hr	Usage gals/day
Toluene	18.50	20.56	36.98	41.09	99.06	110.07
Xylene	1.10	1.22	2.20	2.44	5.89	6.54
Isopropyl Alcohol	1.60	4.44	3.20	8.88	8.57	23.80
EGEE	0.19	0.21	0.37	0.41	0.99	1.10
EGME	0.05	0.05	0.09	0.10	0.25	0.28
EGBE	7.00	15.56	13.99	31.09	37.48	83.30
Methyl Ethyl Ketone	6.50	7.22	12.99	14.44	34.81	38.67
Styrene	10.50	116.67	20.99	233.19	56.22	624.72

Target Organs:
CNS/PNS = Central or Peripheral Nervous System
Repr = Reproductive System/Development
Resp = Respiratory System
CV/BL = Cardiovascular or Blood System
Immun = Immune System
Skin = Skin
Kidn = Kidney
Eye = Eye

APPENDIX D

COMMENTS ON THE DRAFT EA AND RESPONSES TO THE COMMENTS

COMMENT LETTER #1

DUNN EDWARDS PAINTS

Dunn-Edwards PAINTS
THE PAINT THAT PROTECTS.®

October 23, 2003

VIA E-MAIL
mkrause@aqmd.gov

Michael Krause
Planning, Rule Development & Area Sources / CEQA
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 East Copley Drive
Diamond Bar, CA 91765

RE: DRAFT ENVIRONMENTAL ASSESSMENT FOR PROPOSED AMENDED RULE 1113 – ARCHITECTURAL COATINGS

Dear Mike:

1-1 Dunn-Edwards Corporation is an employee-owned business with roots going back to 1925. Since that time, Dunn-Edwards has grown from a small, local enterprise into a major regional manufacturer and distributor employing more than 1,300 people. Our facilities include three factories, four warehouses, and more than 70 store locations in California, Arizona, Nevada, New Mexico and Texas. Dunn-Edwards manufactures high-quality architectural coatings that are marketed primarily to professional painting contractors and institutional maintenance accounts, including schools, hospitals, commercial facilities, and public agencies. Our main office and factory complex, as well as many of our store locations, are within the jurisdiction of the South Coast Air Quality Management District ("SCAQMD"). Consequently, Dunn-Edwards has long been interested and involved in air quality regulatory matters affecting architectural coatings within the SCAQMD.

1-2 This letter responds to the SCAQMD Notice of Completion of a Draft Environmental Assessment ("DEA") for Proposed Amended Rule 1113: Architectural Coatings. In its "Description of Nature, Purpose, and Beneficiaries of Project," the Notice explains that the "proposed amendments to Rule 1113...would lower the VOC content limits for...clear wood finishes" [among other categories] and "phase-out the one-quart or less usage exemption for clear wood finishes...." It concludes that "[n]o environmental topic area was identified that could be significantly adversely affected by the proposed amended rule." The DEA does not, however, address the comments offered by Dunn-Edwards at the Public Workshop and CEQA Scoping Session held on Thursday, September 4, 2003, and later summarized in writing in the Dunn-Edwards letter of September 12 to SCAQMD. Those comments deal, in part, with the need to retain the Small Container Exemption as a mitigation measure to offset the potentially significant adverse environmental impacts of the proposed lower VOC content limit for Clear Wood Finishes. Those comments are again summarized and further expanded upon below.

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SMALL CONTAINER EXEMPTION AS MITIGATION MEASURE

One proposed amendment would exclude Clear Wood Finishes from the Small Container
Exemption after a lower VOC content limit becomes effective for Varnish and Sanding Sealers.
This would materially impair the usefulness of the Small Container Exemption, since a
1-3 significant portion of the products supplied under the exemption are stains, sanding sealers, and
varnishes (primarily conventional solventborne varnishes), especially those formulated as fine
furniture finishes. Technically, these coatings are not subject to regulation under Rule 1113
unless applied to appurtenances that are attached to an architectural structure (e.g., doors, kitchen
cabinets, built-in bookcases, or handrails). Nevertheless, the Small Container Exemption has
been an important part of architectural coatings regulation from the start, and is currently a
feature of every architectural coatings rule in the country.

The Small Container Exemption serves a number of useful purposes within the context of
architectural coatings rules, as has been discussed with the SCAQMD, ARB, and U.S. EPA at
1-4 various times over the past 25 years. (Enclosed with our letter of September 12, 2003, were
copies of correspondence with the SCAQMD, explaining the purposes of the exemption; those
enclosures are hereby incorporated by reference.) Not the least of these purposes is that the
Small Container Exemption actually makes the rules more effective in reducing VOC emissions,
and the elimination or limitation of the Small Container Exemption would result in more
emissions, not less. (See EL RAP letter dated July 26, 1996, among the enclosures referenced
above.) One issue not previously addressed, but particularly relevant here, is the issue of relative
reactivity of VOC solvents used in products that would be supplied under the Small Container
Exemption, and in products meeting the proposed new VOC content limit for Varnish.

The term "reactivity" refers to the ability of a VOC to promote or inhibit ozone formation.
(Potential contribution of VOCs to ozone formation is the reason why VOCs are regulated.)
1-5 Atmospheric chemists have long known that different VOC species have different reactivities,
and that relative reactivities may vary by an order of magnitude or more. Current VOC
regulations (for the most part) seek only mass reductions of all VOC, without regard to relative
reactivity (beyond exempting certain designated "negligably" reactive VOC). Where regulations
result in solvent substitutions, however, relative reactivity becomes very important. Emitting
smaller amounts of more reactive VOC, in place of larger amounts of less reactive VOC, may
not have any beneficial effect on ozone formation, or may even cause more ozone to form, or to
form more rapidly so that population-weighted ozone exposures increase.

The current limit of 350 g/L allows both conventional solventborne varnishes, and alternative
waterborne clear wood finishes. According to the most recent ARB survey of architectural
coatings distributed in California, waterborne varnishes have a sales-weighted average VOC
1-6 content of 266 g/L, which is very close to the proposed limit of 275 g/L. In the "Preliminary
Draft Staff Report for Proposed Amended Rule 1113," dated August 19, 2003, SCAQMD staff
acknowledges that "[t]raditional varnishes…will not likely meet a proposed limit of 275 grams
per liter…." The report also makes it clear that waterborne clear finishes are the most likely
substitutes for traditional varnishes.

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1-7 A review of manufacturers' Material Safety Data Sheets and Product Information Sheets shows that the VOC solvents used in waterborne clear wood finishes typically consist of various glycol and glycol ether compounds. Below is a table (TABLE 1) showing the most common VOC solvents used in waterborne varnishes, along with their Maximum Incremental Reactivity ("MIR") values, as listed in the table incorporated in the ARB statewide regulation for aerosol coatings (one of the few reactivity-based regulations in operation today). The aerosol coatings regulation and table of MIR values, along with related documents, can be viewed on the ARB website at the following location: http://www.arb.ca.gov/regact/conspro/aerocoat/aerocoat.htm

MIR values indicate the amount of ozone that will form, under certain conditions, as a result of the emission of a given amount of VOC (e.g., grams of ozone per gram of VOC emitted). The MIR values of the solvents listed range from 2.56 to 3.36, with an average MIR value of 2.91. This is significantly higher than the average reactivity of the mineral spirits solvents found in traditional solventborne varnishes.

Also given below is a table (TABLE 2) showing a variety of typical mineral spirits (petroleum distillates with average boiling point generally between 340 and 460 degrees Fahrenheit, with aromatics content less than eight percent by weight). These are the VOC solvents primarily used in conventional solventborne varnishes. ARB classifies aliphatic petroleum distillate hydrocarbon solvents into a number of "bins" according to general characteristics of these complex mixtures, and assigns an appropriate MIR value to each bin.

The MIR values of the mineral spirits listed range from 0.81 to 1.62, with an average MIR value of 1.15. Thus we find that, to the extent that lowering the VOC content limit for Varnish from 350 g/L to 275 g/L causes a shift from conventional solventborne varnishes to alternative waterborne clear wood finishes, a decrease of 21 percent in VOC content is accompanied by an increase of 153 percent in VOC reactivity. In terms of relative ozone formation impacts of VOC emitted, substituting waterborne clear finishes for conventional solventborne varnishes will almost double the amount of ozone formed, as calculated below:

$$\frac{275}{350} \times \frac{2.91}{1.15} = 1.99$$

Obviously, adopting a VOC content limit of 275 g/L for Varnish would be counterproductive to the air quality goal of ozone reduction. And excluding clear wood finishes from the Small Container Exemption would only compound the problem, by preventing the use of products that would have only half the ozone forming potential of the allowable complying products. Thus, the Small Container Exemption is necessary to mitigate the potentially significant adverse environmental impacts that would result from adopting the proposed lower limit for Varnish. Our previously stated recommendation is therefore to allow the Small Container Exemption to continue as currently given, without any exclusions or limitations on its operation.

TABLE 1

Solvents Used in Waterborne Clear Wood Finishes

Chemical Name	CAS Number	MIR Value
Ethylene Glycol	107-21-1	3.36
Ethylene Glycol Monobutyl Ether	111-76-2	2.90
Diethylene Glycol Monoethyl Ether	111-90-0	3.19
Diethylene Glycol Monomethyl Ether	111-77-3	2.90
Dipropylene Glycol Monomethyl Ether	34590-94-8	2.70
n-Methyl Pyrrolidone*	872-50-4	2.56
Propylene Glycol	57-55-6	2.75

* Prop. 65-listed chemical known to cause cancer.

TABLE 2

Mineral Spirits Used in Soventborne Varnishes

Description	Criteria	ARB Bin Number	MIR Value
Mineral Spirits, Type I, Class B	Alkanes (2 to <8% Aromatics)	14	1.21
Mineral Spirits, Type I, Class C	Alkanes (<2% Aromatics)	11	0.91
Mineral Spirits, Type II, Class B	(High Flash) Alkanes (2 to <8% Aromatics)	14	1.21
Mineral Spirits, Type II, Class C	(High Flash) Alkanes (<2% Aromatics)	11	0.91
Mineral Spirits, Type III, Class C	(Odorless) N- & Iso-Alkanes (≥90% and <2% Aromatics)	12	0.81
Mineral Spirits, Type IV, Class B	(Low Dry Point) Alkanes (2 to <8% Aromatics)	9	1.62
Mineral Spirits, Type IV, Class C	(Low Dry Point) Alkanes (<2% Aromatics)	6	1.41

1-7 cont.

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1-8 The discussion of reactivity in the DEA appears to be five to ten years out of date. Curiously, no mention is made of the significant progress in scientific research and regulatory policy over the past decade, including the June 2000 milestone ARB statewide regulation for aerosol coatings. As mentioned above, this regulation establishes reactivity-based standards derived from MIR values. In the ARB Initial Statement of Reasons for the amendments incorporating reactivity criteria (available at the ARB website given above), staff explains:

> "It has been known for several decades that individual VOCs vary in the amount of ozone potentially formed once emitted into the air. This concept is referred to as "reactivity." In the current Aerosol Coatings Regulation, total VOC content is limited on a percent-by-weight basis, without consideration of the differences in VOC reactivity. **However, the science of reactivity now allows us to more effectively control VOC emissions by targeting reductions from VOCs that have a higher potential to form ozone."** (Emphasis added.)

1-9

> "To use the concept of reactivity a method is needed to quantify the impact of each VOC on ozone formation. One tool that allows for ozone measurement is a reactivity scale. Many scales have been proposed to quantify the ozone formation potential of VOCs."

> "Since 1989, [Dr. William P.L.] Carter and co-workers at the Statewide Air Pollution Research Center (SAPRC) (and now continuing at the College of Engineering Center for Environmental Research and Technology)...have been conducting the most extensive studies of incremental reactivities using smog chamber experiments and computer modeling. Carter defines incremental reactivity as the maximum amount of ozone formed by the addition of a test hydrocarbon to the base reactive organic gas mixture, divided by the infinitesimal amount of the test hydrocarbon added."

1-10

> "The MIR, maximum ozone incremental reactivity (MOIR), and equal benefits incremental reactivity (EBIR) are three incremental reactivity scales developed by Carter from box models of 39 U.S. urban areas (selection based on conditions described by the U.S. EPA). Incremental reactivity is expressed as the number of additional grams of ozone formed per gram of VOC compound added to the base organic mixture. **Incremental reactivity conveniently computes the ozone formation potential of a VOC...."** (Emphasis added.)

1-11

> "The MIR is the incremental reactivity computed for conditions in which the NOx concentration would maximize the base ROG reactivity. This scenario is typical in air parcels of low VOC-to-NOx ratios such as urban centers, or air parcels in which ozone is most sensitive to VOC changes. These are typical of urban centers in which there are high emissions of NOx and the chemistry is VOC-limited."

> "Studies have also addressed the appropriateness of using a simplified...box model to quantify the reactivities of VOCs. These studies involved comparing the MIR to other reactivity scales.... The results of these studies indicated that the box model-calculated

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MIR scale, using the SAPRC mechanism, is in agreement with other reactivity scales.... **Therefore, we conclude that the MIR scale provides a reliable description of hydrocarbon reactivities and, therefore, can be utilized for ozone control strategy decisions."** (Emphasis added.)

1-11 cont. "For ozone control strategies, the reactivity scale selected should be designed for the best overall air quality benefit. At the request of ARB, Dr. Carter studied 18 different methods (including MIR, MOIR, and EBIR) of ranking the reactivity of individual VOCs.... Dr. Carter concluded that if only one scale is to be used for regulatory purposes in California, the MIR scale is the most appropriate."

"The MIR scale appear to be most accurate for VOC-limited conditions, such as in the South Coast Air Basin, in which VOC controls would be most effective." (Emphasis added.)

"As further evidence of the MIR scale being appropriate for California, the VOC/NOx ratios used for deriving the scale are observed throughout the state of California, including such cities as San Diego, Los Angeles, Sacramento, and San Francisco."

As part of its efforts to validate the scientific basis for using reactivity criteria in ozone control policy, the ARB established in 1996 a Reactivity Scientific Advisory Committee, comprising six eminent experts in the field of atmospheric chemistry: Dr. John H. Seinfeld (California Institute of Technology); Dr. Roger Atkinson (University of California, Riverside); Dr. Jack Calvert (National Center for Atmospheric Research); Dr. Harvey Jeffries (University of North Carolina, Chapel Hill); Dr. Jana B. Milford (University of Colorado); and Dr. Armistead G. Russell (Georgia Institute of Technology). Biographies of the RSAC members are available at the ARB website using the following link: **http://www.arb.ca.gov/research/reactivity/rsac/bios.htm** The ARB Initial Statement of Reasons continues:

1-12 "To further validate the use of the MIR scale, at the suggestion of our Reactivity Scientific Advisory Committee (RSAC) and industry, ARB contracted with Dr. William Stockwell at the Desert Research Institute to conduct a review of the base mechanism (SAPRC99) from which the MIR scale is derived. The result of the review was encouraging. Stockwell concluded that Carter's mechanism represents "state of the science for air quality models." The RSAC concurred with Stockwell at its October 8, 1999, meeting and found that SAPRC99 represents the most thoroughly reviewed and best documented chemical mechanism available."

"Although the MIR values are calculated using a "state-of-the-science" chemical mechanism, the reactivity estimates of some ROC classes are still uncertain."

"These uncertainties do not need to preclude regulatory development...." (Emphasis added.)

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"The potential of using reactivity as a ROC control approach has also been evaluated…and we believe the scientific foundation needed for using reactivity is well-established and readily available." (Emphasis added.)

In the ARB "Final Statement of Reasons for Rulemaking, Including Summary of Comments and Agency Response," staff confirms that "the ARB is convinced that the science of reactivity is ready for use in regulatory programs." Moreover, "[w]hile ARB staff agrees that the science of reactivity will continue to evolve and improve, the science is sufficiently robust to expand its use in control strategies to control ozone in California. Furthermore, ARB staff worked extensively with the RSAC, comprised of leaders in the field of atmospheric chemistry, to ensure the fundamental science behind staff's work was sound. We also note that members of the RSAC have conducted several studies on the ability of MIRs to predict ozone formation in both urban and regional domains. The results of these studies indicate that the MIR scale can be used to describe VOC reactivity in "real world" situations."

1-12 cont.

In its Resolution 00-22 (June 22, 2000) adopting the proposed amended aerosol coatings regulation, the Air Resources Board finds that:

"VOCs have differing abilities to induce formation of ozone in the air once emitted;

"By understanding the difference in the reactivities of different VOCs, an efficient control strategy can be developed that…limits the ozone formed from…VOC emissions;

"The MIR scale is an appropriate index for quantifying ozone formation of VOCs in California and can be used as the basis for ozone control strategies…."
(Emphasis added.)

1-13

To ensure that the regulation would be responsive to the progress of scientific research, the Air Resources Board resolved to direct "the Executive Officer to review the Tables of Maximum Incremental Reactivity (MIR) Values 18 months after the effective date of the amendments, and every 18 months thereafter, to determine if modifications to the MIR values are warranted." ARB staff contracted with Dr. Carter to re-calculate and update the MIR values periodically, most recently in February 2003. Adoption of proposed revised MIR values is scheduled for a public hearing on December 3, 2003, in Sacramento. Of the approximately 670 VOCs or VOC categories listed, for which Dr. Carter re-calculated MIR values, only 26 were adjusted by more than five percent. More than half required no significant adjustment, including the VOC species given in TABLE 1 and TABLE 2 of this letter.

1-14

In summary, to the extent that Proposed Amended Rule 1113 will promote the substitution of waterborne Clear Wood Finishes at 275 g/L for traditional solventborne Varnish and Sanding Sealers at 350 g/L, the best available scientific evidence indicates that ozone formation impacts would almost double. Therefore, continuation of the existing Small Container Exemption, without the limitation proposed, is a necessary and appropriate mitigation measure.

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If you have any questions regarding this letter, or need any further information, please feel free to call me at (323) 826-2663.

Very truly yours,

Robert Wendoll
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Howard Berman

COMMENT LETTER #1 FROM
DUNN-EDWARDS PAINTS

(OCTOBER 23, 2003)

Response to Comment 1-1

The SCAQMD staff appreciates the interest and involvement by Dunn-Edwards in the architectural coating rule making process.

Response to Comment 1-2

The SCAQMD disagrees with the commentator's opinion that the Draft EA did not address previously submitted comments. The analysis in the Draft EA directly responds to previously submitted comments by analyzing the environmental effects of PAR 1113 identified by the commentator. Lowering the volatile organic compound (VOC) content limit for clear wood finishes would not result in a significant adverse air quality impact necessitating a mitigation measure but rather would result in an air quality benefit. According to CEQA Guidelines §15126.4(a)(3), "Mitigation measures are not required for effects which are not found to be significant." On the contrary, retaining the exemption of the quart-size containers of clear wood finishes from the rule's VOC limit would result in a reduction in the benefit to air quality that will occur under the project. Responses to the September 12, 2003 letter to SCAQMD staff can be found in the Staff Report for PAR 1113 which is located in the Final Board Package for PAR 1113.

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Response to Comment 1-3

The small container exemption has been subject to annual reporting in order for the Executive Officer to monitor its use to ensure that this exemption was not overly used. It was never intended as a means of reducing emissions. SCAQMD staff's research shows that, unlike other coating categories, there has been a significantly high sales volume in small containers for clear wood finishes. Because low VOC products are available, staff no longer believes the small container is needed for clear wood finishes.

For example, the products listed in Appendix B of the Environmental Assessment are all adequate replacements for their higher-VOC counterparts currently sold in small containers. Furthermore, the AVES Study clearly illustrates the ability of the low VOC varnishes, sanding sealers, and lacquers to successfully replace existing high VOC products for initial coating, as well as touch-up and repair. Lastly, the Rule 1136 – Wood Coatings Technology Assessment completed in August 2003 demonstrates the successful transition to waterborne coating systems, including the use of waterborne stains, sanding sealers, and topcoats (varnishes and lacquers), by wood coating facilities. Staff has also collected information that shows that the same products used in the shop are also used in the field. As a result, the lower VOC coatings can be used for the purposes that the higher VOC coatings, currently sold in small containers, are currently being used for. Therefore, there is no need for the products sold in small containers to have a higher VOC limit than the products sold in gallon containers. Based on this information and the fact that air quality in the district is so poor, the assertion that other architectural coatings rules elsewhere in the country have the quart exemption is irrelevant.

Response to Comment 1-4

The SCAQMD disagrees with the commentator's opinion that limiting the small container exemption would increase VOC emissions. Responses to the September 12, 2003 letter to SCAQMD staff can be found in the Staff Report for PAR 1113 which is located in the Final Board Package for PAR 1113. In addition, the EA discusses the issues raised in previous correspondence regarding potential environmental impacts of reducing VOC limits. Please refer to Response to Comment 1-3 for a discussion on small container exemption.

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Response to Comment 1-5

The commentator is incorrect in his assertion that the issue of reactivity has not been previously addressed. This issue was comprehensively addressed in Chapter 2 of the Draft EA. Further, reactivity of VOC solvents has been addressed in the CEQA documents for previous amendments to Rule 1113.

SCAQMD staff disagrees that implementing a lower VOC limit for stains, varnishes, and sanding sealers would be counterproductive to the air quality goal of ozone reduction. Lowering the overall volume of VOC solvents from solvent-based formulations by converting to waterborne formulations will continue to lower VOC emissions, thereby reducing ozone formation in the region. Staff disagrees with the notion that elimination of the small container exemption and the use of waterborne formulations in lieu of solvent-borne formulations will result in the use of solvents with higher reactivity and thus negate any environmental benefits. To begin with, it would be inappropriate to simply take arithmetical averages of the MIR values of some of the solvents found in the solvent-borne formulations and compare them to the MIR values of the waterborne formulations. According to Dr. Carter, "averaging the MIRs of the compounds found in finishes is not the appropriate approach; you need to do weighed averages based on the amounts of compounds actually in the finishes" (e-mail from Dr. Carter to N. Berry, SCAQMD, October, 2003). An additional analysis comparing the typical solvents found in solvent-borne clear wood coatings indicates the presence of solvent species other than glycols. These include toluene, xylene, and ethyl benzene, which all have significantly higher MIR values based on currently-available data. The inclusion of additional VOC species typically found in solvent-borne coatings clearly shows an overall higher average MIR value then with the glycols listed and included in waterborne formulations. Finally, the percent of solvent content found in solvent-borne formulations is much greater than the quantity of solvents found in waterborne coatings, which would make the weighted MIR in solvent-borne coatings greater than the already higher average MIR. One should also note that it is not a forgone conclusion that elimination of the small container exemption will necessitate the switch to waterborne chemistries. Manufacturers will have the option to use VOC exempt solvents and thus retain the basic resin chemistry used in solvent-borne formulations.

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In response to the commentator's and others' recommendation to retain the small container exemption, staff is proposing an alternate amendment that phases out the exemption and in the interim establishes maximum VOC limits for clear wood finishes in those small containers.

Specifically, the small container exemption would be deleted effective July 1, 2008 and in the interim, the maximum VOC limit for varnishes and sanding sealers sold in small containers will be 450 g/l, and 550 g/l for lacquers.

Response to Comment 1-6

Traditional solvent-borne varnish formulations are likely unable to meet the proposed VOC content limit of 275 grams per liter, however, clear wood finishes using waterborne formulations that comply with the proposed future compliance limit are widely available and in use, and are considered to be likely substitute products with good performance characteristics. Appendix B of the Environmental Assessment lists currently available clear wood finishes that comply with the proposed future limit of 275 grams per liter.

Response to Comment 1-7

The commentator takes the position that adopting a VOC limit for clear wood finishes at 275 grams per liter is counterproductive, because, as the commentator claims, the average MIR value of compounds found in waterborne clear wood finishes is significantly higher than the average MIR value for compounds in solvent-borne clear wood finishes. However, as noted by the commentator in Comment 1-5, ozone formation potential is a direct result of reactivity times the quantity of VOC emitted. Whether the limit is counterproductive depends on the quantities of VOCs reduced and substituted, and their reactivities. As will be discussed later, there is considerable uncertainty as to the specific VOC species in both solvent-borne formulations and to a lower extent in waterborne coatings. Given such significant uncertainties, it is speculative to conclude that the low VOC limit for clear wood finishes would result in an air quality detriment. Indeed, the commentator's own numbers show otherwise. Even assuming the commentator's assertion that the average reactivity of waterborne finishes is approximately 2.5 times the average reactivity of solvent-borne finishes (2.91/1.15), there will be a net ozone reduction resulting from lowering the VOC limit because of the substantially lesser mass of VOCs being emitted from the waterborne finishes.

Thus, the proposed regulatory limit of 275 grams per liter for clear wood finishes translates into an actual VOC content of 110 grams per liter for waterborne coatings. As the commentator is aware, a regulatory VOC content is determined by excluding water, which results in a higher number than the actual mass VOC content of the waterborne coatings. However, solvent-borne coatings do not have water, so their regulatory VOC content of 350 grams per liter is the same as their actual VOC content.

Assuming a liter of each type of coating is used, 110 grams of VOC will be emitted from the waterborne finish while 350 grams of VOC will be emitted from the solvent-borne formulation. Again, assuming the commentator's asserted average reactivity values, the ozone formation potential of waterborne finishes is 110 x 2.91 = 320.1 which is still less than solvent-borne finishes at 350 x 1.15 = 402.5. Therefore, the decrease in actual VOC content is not 21 percent (275/350) as the commentator claims but rather 69 percent (110/350). Therefore, using the MIR values provided by the commentator, the waterborne clear wood finishes would reduce amount of ozone by 21 percent, as calculated below:

$$\frac{110}{350} \times \frac{2.91}{1.15} = 0.79$$

Moreover, the commentator improperly ignores other key VOC species in solvent-borne clear wood finishes with much higher reactivity values. For example, the commentator only lists mineral spirits as the solvent used in traditional coatings, which skews the data to reflect a low reactivity value. While mineral spirits can be found in traditional solvent-borne varnishes, they are not always the only component of clear wood coating formulations. As noted in Response to Comment 1-5, toluene and xylene have a prominent presence in the solvent-borne formulations, but were not included in the commentator's comparison analysis. According to CARB's "Improvement of Speciation Profiles for Architectural and Industrial Maintenance Coating Operations" (CARB, June 1996), solvent-borne formulations include a wide variety and mixture of alkenes, alkanes and aromatic petroleum distillates that have varying MIR values. Typical clear wood finishes, including sanding sealers, lacquers and varnishes, consist of up to 27 percent toluene and xylene in the solvent-borne formulation based on speciation profiles of lacquers, varnishes and sanding sealers and can consist up to over 100 different VOC species for one coating.

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Furthermore, the commentator's blanket assertion that waterborne finishes are much more reactive than solvent-borne finishes is incorrect. Table 1-1 lists the average reactivity, represented as a MIR value, of the solvents found in traditional clear wood finish formulations. The average reactivity of 3.44 for the solvent-borne formulation is higher than the average reactivity of 2.91 for waterborne finishes as provided by the commentator. The MIR values were taken from CARB's aerosol coating regulation accessed from its website at the following internet address: http://www.arb.ca.gov/regact/conspro/aerocoat/aerocoat.htm.

Table 1-1

Comparison of Reactivity of Solvents Used in Solvent-borne Clear Wood Finish Formulations

Solvents Used In Traditional Clear Wood Finishes	
CHEMICAL NAME	**MIR VALUE**
Toluene	3.97
Xylene	7.45*
Methyl Ethyl Ketone (MEK)	1.49
Ethylene Glycol Ethyl Ether (EGEE)	3.78
Ethylene Glycol Methyl Ether (EGME)	2.98
Mineral Spirits (average MIR value)	1.15**
Naphtha (petroleum distillates)	3.26
AVERAGE MIR VALUE	**3.44**

* - Because commercial xylene is a mixture of three isomers (meta-, ortho- and para-), the MIR value listed is an average of three isomers' MIRs.

**- Average depends on the overall composition of mineral spirits, including the level of straight-chain and branched-chain alkanes and aromatic content, and was included as a value in the commentator's letter.

As noted above, while various types of mineral spirits are used in traditional formulations of clear wood finishes, they are not the only compounds used. Toluene and xylene are also used, along with MEK, EGEE, EGME, etc. It is not an accurate depiction of the conventional solvent-borne coating formulation if the commentator analyzed mineral spirits as the only solvent used. Consequently, the SCAQMD staff disagrees that by substituting waterborne clear finishes for conventional solvent-borne varnishes will double the amount of ozone formed. Using the updated MIR value from Table 1-1 above, reformulating traditional clear wood finishes (at 350 grams per liter actual VOC) to waterborne clear wood finishes (at 110 grams per liter actual VOC) would result in a reduction in the ozone forming potential of the reformulated coating by approximately 73 percent, as indicated by the following equation:

$$\frac{110}{350} \times \frac{2.91}{3.44} = 0.27$$

Further, the commentator's claim that the use of the quart container exemption is to mitigate the adverse ozone impact of the allegedly more reactive waterborne finishes is incorrect. The estimated overall ozone reductions are even greater if one considers the fact that the weighted average actual VOC of the solvent-borne formulations for clear wood finishes is significantly higher than 350 grams per liter since these products are sold in quart or smaller containers which have VOC content at the 450-550 grams per liter range and are exempt from the VOC limit requirements of the rule. Reformulating the higher VOC clear wood finishes into compliant waterborne formulations would result in a reduction in the ozone forming potential by approximately 79 percent, as indicated by the following equation:

$$\frac{110}{450} \times \frac{2.91}{3.44} = 0.21$$

To treat waterborne and solvent-borne solvents equally would be an unfair and overly simplistic assessment or comparison. The analysis should include a weighted-reactivity approach for **all** the solvent species in the formulation. However, in order to calculate a weighted average for all solvent-borne and waterborne clear wood finishes, one would have to collect the speciation data, which varies for each coating formulated and is typically considered proprietary information. The following is a summary of comments and analysis conducted by CARB to demonstrate a more feasible approach of calculating overall ozone formation from two coatings, one waterborne and one solvent-borne:

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The commentator states that relative ozone impacts can be determined by comparing two single ingredients from a waterborne and a solvent-borne coating. To provide a complete comparison of the ozone formation potential for two coatings, it is necessary to consider all of the ingredients in the coating and the relative contribution of each ingredient in the coating. Comparing the relative reactivity of two single coating ingredients can identify which ingredient is more reactive on its own, but it doesn't reflect the overall reactivity of a coating because it does not account for the relative mass contributions and it doesn't acknowledge the presence of water and solids. Focusing only on VOCs can make a coating seem highly reactive, even when it contains a relatively small quantity of VOCs.

Consider the following example for two coatings, one solvent-borne and one waterborne, that both have a VOC Regulatory value of 280 g/l, whereas the actual VOC of the waterborne formulation is significantly lower. These coatings are based on actual products that were reported in CARB's 2001 Architectural Coating Survey, with the data slightly altered to protect manufacturer confidentiality.

Solvent-borne Coating (280 g/l): Reactivity of All Ingredients

n	**Ingredient**	**MIR Value** (g O_3/g TOG)	**[Wt%]$_i$**
1	Hydrocarbon Solvent (Bin 14)	1.21	19.3
2	Aromatic 100	7.51	1.3
3	Hydrocarbon Solvent (Bin unknown)	1.86	9.2
4	Solids	0	70.2
			Total Wt% = 100%

Waterborne Coating (Regulatory VOC = 280 g/l): Reactivity of All Ingredients

n	**Ingredient**	**MIR Value** (g O_3/g TOG)	**[Wt%]$_i$**
1	2-Propoxyethanol	3.50	5.7
2	2-Butoxyethanol	2.88	4.4
3	Toluene	3.97	1.0
4	Water	0	37.3
5	Solids	0	51.6
			Total Wt% = 100%

A comparison can be made between the two primary VOCs in each coating: Hydrocarbon Solvent (Bin 14) and 2-Propoxyethanol. If the comparison only includes the MIR values, as demonstrated by the commentator, it appears that the waterborne product is more reactive.

$$\frac{[\text{WB}]}{[\text{SB}]} = \frac{[\text{2-Propoxyethanol MIR Value}]}{[\text{HC Solvent (Bin 14) MIR Value}]} = \frac{[3.50 \text{ g } O_3/\text{g TOG}]}{[1.21 \text{ g } O_3/\text{g TOG}]} = \mathbf{2.9}$$

However, the appropriate method of comparison, as recommended by Dr. Carter, is to compare the weight fractions of the two predominant ingredients. If this is done, the waterborne product is less reactive.

$$\frac{[\text{WB}]}{[\text{SB}]} = \frac{[\text{2-Propoxyethanol MIR Value}]*[\text{Wt\%}]}{[\text{HC Solvent (Bin 14) MIR Value}]*[\text{Wt\%}]} = \frac{[3.50 \text{ g } O_3/\text{g TOG}]*[5.7\%]}{[1.21 \text{ g } O_3/\text{g TOG}]*[19.3\%]} = \mathbf{0.9}$$

Lastly, if the weight fractions and the relative MIR values were analyzed for all the listed solvents, the ratio of the waterborne over the solvent borne would be even less, 0.73, which demonstrates the waterborne formulation will have a 27% higher overall reduction in ozone formation.

Response to Comment 1-8

The reactivity discussion in the EA has a similar analysis as in the past because the conclusions have not changed with regard to reactivity. The discussion was updated to include the contract with CE-CERT to carry out an environmental chamber study to assess the ozone and PM formation potential of selected types of VOCs emitted from architectural coatings, etc. The updated reactivity section in the EA included a discussion of funding for additional studies and how the studies will be peer reviewed when complete before generating conclusions or creating new regulatory approaches. Additional information on reactivity is provided in the following paragraphs.

In 1995, the California Air Resources Board (CARB) began the process of investigating using photochemical reactivity as an ozone control approach for consumer products and aerosol coatings as a substitute for the mass-based VOC content limit regulation. It was concluded by CARB staff and industry representatives that it was acceptable to replace the VOC content limits with mandatory reactivity-based VOC limits to provide more regulatory flexibility while efficiently reducing the ozone formed from aerosol coatings. In 1996, the Reactivity Research Advisory Committee (RRAC) approved the use of the maximum incremental reactivity (MIR) scale for use in developing reactivity-based control strategies for aerosol coatings in California. According to the CARB, "the aerosol coating category was chosen for the first consumer product reactivity based regulation because it is a well-characterized, discrete category within the inventory. This will allow us (CARB) to carefully monitor the implementation of the regulation to ensure that this regulatory approach is effective." (CARB, "Final Statement of Reasons for Rulemaking," 2000) Established MIR values are described in a subsequent comment in the commentator's letter, which purports to compare the reactivity of solvents used in traditional solvent-borne varnishes versus waterborne products. Please refer to Response to Comment 1-7 for a discussion on the reactivity comparison.

In general, the commentator provides a simplistic comparison of overall ozone potential from solvent-based formulations compared to waterborne formulations. However, as indicated in the staff report and the existing rule language, the SCAQMD recognizes the potential of reactivity as an alternative ozone control strategy, and recognizes the limitations of currently available data on MIR values, mainly the uncertainty associated with the current data, as published in numerous reports by the experts in the field, in particular Dr. William Carter of CE-CERT. According to Dr. Carter, "there is a minimum of 30 percent uncertainty of even well-standing compounds, and the uncertainties of compounds that have not been studied is greater. The ongoing experiments with representative petroleum distillates should address uncertainties for most solvent-based coatings. For the compounds listed in (R. Wendoll's) Table 1, experiments have been carried out to test the mechanisms for Ethylene Glycol Monobutyl Ether, n-Methyl Pyrrolidone, and Propylene Glycol, but Ethylene Glycol, Diethylene Glycol Monoethyl Ether, Diethylene Glycol Monomethyl Ether, Dipropylene Glycol Monomethyl Either have not been studied, so their MIRs are more uncertain. The MIR uncertainties for these are at least 50 percent and perhaps greater." (e-mail from Dr. Carter to N. Berry, SCAQMD, October, 2003) Because of the uncertainties and lack of all the necessary data associated with the reactivity-based approach, CARB did not recognize this approach as a feasible alternative in the Suggested Control Measure for Architectural Coatings at this time (Final Program Environmental Impact Report, CARB, 2000).

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A state-of-the art reactivity chamber was constructed at the CE-CERT facility at University of California, Riverside. In recognition of the SCAQMD's on-going commitment to evaluating this concept, the SCAQMD has contracted with CE-CERT to further study the reactivity and availability of VOC species most commonly found in waterborne and solvent-based coatings. The scope of the project will focus on assessing the reactivity of VOC species most commonly found in solvent-based and waterborne architectural coatings, including studying ozone reactivities of low volatility solvents and re-evaluating uncertainties resulting from current data and modeling. The SCAQMD project will further explore the potential of the new environmental chamber to investigate availability of the low volatility solvents and coordinate the studies with other availability studies. CARB has a limited pilot program in its Aerosol Coatings rule that allows the use of a reactivity-based control approach. What made the use of the reactivity approach in regulating aerosol coatings feasible was primarily the limited number of solvents used in aerosol formulations. The same does not hold true for architectural coatings, however, which represent one of the largest most complex non-vehicular emission source category. Because there are more categories and formulations, as well as greater number of solvents used in architectural coatings, there needs to be a heightened concern regarding uncertainties with MIR values and, thus, more complexity and higher risks with formulating and regulating. To address these uncertainties, similar to the SCAQMD, CARB has also contracted with CE-CERT to conduct additional studies in an effort to reduce the uncertainty of MIR values. Both the SCAQMD and CARB contracts include additional analyses for some of the solvent species highlighted in the comment letter. Therefore, at this time it is not prudent to regulate VOC emissions based on the ozone-forming potential using currently available MIR data. It should be noted that MIR values have changed twice since their original adoption. As mentioned in Response to Comment 1-17, one revised MIR value was for a compound used in waterborne clear wood finishes. Had a reactivity-based rule been in effect at that time, it would have been amended to reflect the new MIR values, which would have required those coating manufacturers using that compound to reformulate in order to comply with the amended rule. Until adequate, peer-reviewed data are available on the MIR values of these solvent species, especially from the newly constructed chamber, the mass-based regulatory approach continues to be the only proven ozone control strategy.

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According to CARB's MIR values, individual VOCs vary in the amount of ozone formed once emitted into the air. In its "Final Statement of Reasons for Rulemaking" (CARB, June 2000), CARB states, "…the reactivity-based Aerosol Coating Regulation does represent a new way of controlling VOC emissions. As such, staff believes that a reactivity-based control strategy should be evaluated on a case-by-case basis and **not automatically applied to other product categories.** Staff does believe the science of reactivity is sufficiently well developed to seriously consider using reactivity in other regulatory programs **as appropriate and necessary**." (Emphasis added) Besides the aerosol regulation, no other regulatory program has adopted the reactivity-based approach. According to its "Staff Report for the Suggested Control Measure (SCM) for Architectural Coatings", CARB "…intends to investigate the feasibility of incorporating mandatory reactivity-based limits into the architectural coatings SCM. Further research into the reactivity of VOCs commonly used in architectural coatings may be warranted, both for VOCs that we currently do not have data for, as well as for VOCs for which we need improved data."(CARB, June 2000) However, CARB rejected the use of the reactivity-based approach as not a feasible alternative in its (SCM) for Architectural Coatings, adopted after the inclusion of the alternative reactivity-based approach on a limited scale in the Aerosol Coatings rule. According to the Program Environmental Impact Report prepared for the CARB's SCM for Architectural Coatings (SCH# 99062093, CARB, 2000), the following reasons for rejecting a reactivity approach to regulate architectural coatings were identified:

1. The required inventory of speciated VOC data for each product was not sufficiently provided in order to accurately assess the reactivity of products and therefore, can not establish limits.
2. Some VOCs which are used exclusively in architectural coatings do not have well-established reactivity values.
3. Some of the VOCs needing further characterization are not easily evaluated using present methodologies.
4. In an El Rap concept paper it is acknowledged that not all VOCs used in architectural coatings have been thoroughly studied to reliably assess their reactivity. CARB disagreed with El Rap's suggestion's to use a default value of "one" where the reactivity value is unknown because reactivities of VOCs can vary by more than an order of magnitude.

CARB has also contracted with CE-CERT to conduct additional reactivity studies to reduce the uncertainty of VOC species most commonly found in architectural coatings. While there is merit to this approach, there is no evidence that the goal of reducing ozone is being thwarted by regulating and reducing the VOC content limit of architectural coatings. By comparing typical compounds used in solvent-borne coatings, especially aromatic compounds, to compounds used in waterborne coatings, the overall reactivity is reduced which means the ozone formation will be reduced as well.

Finally, in Response to Comment 1-5, it is noted that the current MIR data have high levels of uncertainty and need to be studied further before consideration for significant policy development regarding controlling regional ozone concentrations. As also stated in Response to Comment 1-5, SCAQMD and CARB have contracted with CE-CERT to conduct additional studies on the MIRs for the most commonly used VOC species in architectural coatings. There are many policy implications involved with adopting the mandatory reactivity-based approach over the current VOC content limit approach, including the burden on the industry to potentially limit usage of specific compounds in order to comply. Similar to determining the VOC content for each coating, the conceptual reactivity-based approach will require the coating manufacturer to mix the compounds with various MIR values and formulate to a value less than the compliant limit. Current testing allows the regulator to test the end product to ensure compliance with the VOC content limit. The reactivity-based approach would require extraction and testing of each compound from the end product to ensure the type and amount of chemical are what contributed to the overall weighted MIR value of the coating. This process could lead to a much more complex regulation. It could also result in the loss of regulatory compliance options such as the averaging provision, restricting manufacturers' product formulation options and eliminating certain product forms. USEPA has already commented in CARB's "Final Statement of Reasons for Rulemaking" that there are enforceability issues that would prevent effective enforcement of the reactivity-based program (CARB, 2000). USEPA has also indicated that a reactivity-based program would require considerably more resources in terms of data collection, maintenance, and analytical measurements than mass-based VOC control programs. In addition, because of industry claims that speciated VOC data are confidential business information, public accountability may be reduced and there may be concerns related to Clean Air Act, section 114(c), requirements for USEPA to make emission data public ("Final Statement of Reasons for Rulemaking," CARB, June 2000). In the same document, CARB acknowledges that existing air quality models may not currently have sufficient resolution to account for complete VOC speciation and, thus, more sophisticated models need to be developed.

If the MIR values change, and they have changed twice since their original adoption in 2000 based on more recent analyses, the coating manufacturers may be required to reformulate their products more frequently in order to comply with a reactivity-based approach. Currently, a VOC content limit regulation allows flexibility to formulate without too much control of individual compounds used in the formulation. The primary limiting factor in the formulation of the coating is whether the compound has toxic properties. This toxicity restriction would apply to all coating formulations whether regulated for their VOC content or ozone reactivity.

SCAQMD staff believes that a reactivity-based approach can be a highly effective regulatory approach provided the necessary analytical, technical and implementation tools are developed. The development of these tools and the elimination of the various implementation and enforcement hurdles are extremely important for the ultimate success of this regulatory approach.

Response to Comment 1-9

CARB has adopted the MIR scale of Dr. William P.L. Carter (2000) as a means of quantifying ozone impacts in its regulations of emissions of VOCs from aerosol coatings. However, as the commentator noted, this is one tool that allows for ozone measurement. There are other methods to quantify the ozone formation potential of VOCs, which produce different results and, thus, generate more levels of uncertainty for the MIR values. In addition, there are other methods to regulate and reduce VOC emissions from various product sources. Dr. Carter continues to review the MIR values to minimize uncertainty. Both the SCAQMD and CARB have initiated research projects with Dr. Carter to better understand the reactivity of the various components used in solvent borne and waterborne formulations and minimize uncertainties in the MIR values.

Response to Comment 1-10

The SCAQMD is aware of reactivity research being performed by Dr. Carter and is following it closely. The SCAQMD has provided comprehensive reasons why a reactivity-based architectural coating rule is not prudent at this time. Please refer to Responses to Comments 1-7 and 1-12 for the specific reasons why a reactivity-based architectural coating rule is not considered to be feasible at this time. In his "Evaluation of Atmospheric Ozone Impacts of Coatings VOC Emissions" presentation (Carter, September 2003), Dr. Carter identified the reactivity research needs for VOCs for architectural coatings. He highlighted that reactivity data are already available for many types of VOCs used in coatings including:

- Data available for representative alkanes, aromatics, alcohols, glycols, esters and a few others, however, not all aspects of mechanisms are adequately evaluated.

He added that reactivity estimates are uncertain for some important types of coatings VOCs such as:

- No data for low volatility compounds such as Texanol®
- Petroleum distillates have large compositional uncertainty and components include unstudied VOCs
- Amines and alcohol amines have very large mechanism uncertainty

Dr. Carter stated that there is a need to develop lower cost reactivity screening and enforcement methods, and concluded that there is uncertainty on how much deposition on surfaces and how other non-atmospheric loss processes are affecting atmospheric availability.

Response to Comment 1-11

In general, the South Coast Air Basin as a whole is considered VOC limited with a relatively low VOC/NOx ratio level, however it varies in degree across the Basin. The box model is a good place for proving concepts such as the performance of a reactive chemical mechanism when subjected to basic changes in parameters. The use of the box is to assess different mechanisms for comparison purposes. The box doesn't typically incorporate any real-time physical characteristics (i.e. transport, dispersion, unique emissions combinations) because it is mostly used to develop a level of performance for a given or standard set of conditions. Reactivity is in effect a simplification of the complex processes that take place in the air. It assigns a single number for the reactivity of a species. This ignores the fact that the reaction rate is influenced by a number of factors. Given that it is a simplification, it would not be wrong to use a simplified model to calculate it. Please refer to Response to Comment 1-7 with regards to the concerns and issues with the SCAQMD adopting a reactivity-based approach to regulating VOC emissions and ozone. In addition, refer to Response to Comment 1-12 with regards to CARB's statement on adopting a reactivity-based control strategy on a case-by-case basis, and as appropriate and necessary. The 2003 AQMP continues the SCAQMD's support for studying reactivity as a basis for regulation, but also indicates that the SCAQMD must continue lowering both NOx and VOC emissions in the district to achieve the ozone standard.

Response to Comment 1-12

The SCAQMD is aware of the work of the RRAC, which was comprised of independent, respected scientists who made their recommendations to CARB on the science related to hydrocarbon reactivity, and that they agreed that the MIR scale, developed by Dr. Carter, "…represents the most thoroughly reviewed and best document chemical mechanism available."

Please refer to Response to Comments 1-5 and 1-7 with regards to the concerns and issues with the SCAQMD adopting a reactivity-based approach to regulating VOC emissions and ozone. In addition, refer to Response to Comment 1-8 with regards to CARB's and USEPA's opinion on adopting a reactivity-based control strategy on a case-by-case basis, and as appropriate and necessary. As indicated in earlier responses, the newly constructed environmental chamber at UC Riverside will allow CARB and SCAQMD to reassess the old MIR values generated from the old chamber. If reactivity-based approach was adopted to regulate architectural coatings prematurely, coating manufacturers would be required to reformulate their product(s) in order to comply with these uncertainties and changing MIR values. The frequency of reformulations would depend on whether the MIR value needs to be changed and how often the scientific studies reveal new information. MIR values have changed twice since the original adoption in June 2000. Elimination of these uncertainties is of paramount importance prior to implementation of reactivity-based regulatory approach. The development of a large scale reactivity-based regulatory approach for architectural coatings in order to ensure or successful implementation, provide the needed certainty for manufacturers and minimize the role of errors in measuring the environmental benefits.

Response to Comment 1-13

As noted in Response to Comment 1-16, coating manufacturers would be required to reformulate their product(s) in order to comply with ongoing changes to the MIR values. While the commentator highlights that 26 out of 670 VOCs required adjustment to the MIR value of more than five percent, changes to the MIR for one compound could be a dilemma for the coating manufacturer because a coating formulation depends on the importance of that compound to the formulation, i.e., the amount used and the availability of effective substitutes. One of the revisions to the original list of MIR values was with a compound, dipropylene glycol monomethyl ether, the commentator listed as a solvent used in waterborne clear wood finishes. If the reactivity-based approach had been adopted to regulate VOC emissions from architectural coatings, coating manufacturers formulating with dipropylene glycol monomethyl ether would need to reformulate to ensure compliance.

Response to Comment 1-14

Please refer to Response to Comment 1-8 with regard to why the SCAQMD does not agree with the opinion of the commentator that ozone formation would double under a VOC content limit regulation. In addition, please refer to Response to Comment 1-2 as to why maintaining the Small Container Exemption is not a mitigation measure.

COMMENT LETTER #2

THE NATIONAL PAINT AND COATINGS ASSOCIATION(NPCA)

October 24, 2003

Mr. Michael Krause
DEA -- AIM Coatings Rule
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, California 91765

RE: DEA for Proposed Revisions to Rule 1113

Dear Mr. Krause:

2-1 The National Paint and Coatings Association (NPCA) is providing the following comments on the SCAQMD's Draft Environmental Assessment (DEA) relating to the proposed of revisions to Rule 1113 that were initially proposed in mid-August 2003.

The chief purpose of a Draft Environmental Assessment is to thoroughly review the environmental impacts, positive and negative, of a proposed regulation to determine whether the regulation results in net gains for the environment. For a variety of reasons set out below we do not believe that the proposed revisions have been adequately evaluated in terms of their costs and technological feasibility. Consequently the findings of the DEA are fatally flawed.

2-2 As noted, the proposed revisions were announced in mid-August and there really has not been sufficient time for industry to fully evaluate the basis for the proposed adoption. This rulemaking has been characterized by late or last minute exchange of information exercises which has made it impossible for industry representatives to adequately review the information provided. Even now as these comments are due, the most recent version of the proposed revisions is not generally available to the public on the SCAQMD web site. As a result, many will not make the deadline for commenting on the DEA. We believe that for this reason and others set out below the rulemaking should be extended.

2-3 The SCAQMD's DEA relies extensively upon the AVES study. Our members reviewed the written report and noted several deficiencies which fundamentally undermine the credibility of the study for purposes of justifying the revised. These are set out below under the various coatings categories at issue.

2-4

CLEAR WOOD COATING

Interior Clear Wood

Taber Abrasion Test is an inappropriate test for clear wood coatings for low VOC thermoplastic coatings because the material softens under the instrument

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and does not powder. Hence the test gives a false impression of durability by the material retaining more weight.

Even for low VOC thermosetting clear coatings which do not have this problem, taber abrasion cannot be relied upon. It can only be a lab test that lets one know that a minimal test has been met that justifies further testing for performance. These additional necessary performance tests are various mar and scuff tests that subject the coating to contacts mimicking actual foot traffic. "Durability" as a practical matter for such coatings (i.e., when it is worn enough to merit resurfacing) is not dictated by the actual remaining film left over time
2-4 cont. but by its appearance. Hence, taber abrasion is not dispositive of this issue; film thickness can still be fairly high when the appearance due to traffic (mars and scuffs) would prompt replacement.

An important practical point ignored by the testing so far is that many of the performance characteristics of polymers used here can only be fully seen under actual scuff and mar tests (foot traffic). Some of the lab tests cited by the SCAQMD such as the pencil scratch for durability do not manifest these performance problems. Hence, manufacturers of low VOC clear floor coatings would not perform such lab tests except for a minimal vetting purpose They would require actual traffic tests before producing a product.

One of these absolutely required test not done by the SCAQMD is the coefficient of friction test which determines the probability of slips and falls on the coating. A coefficient below .5 in the lab test means the coating is too risky
2-5 and would it be reformulated. Acceptable coefficient friction is a <u>sine qua non</u> performance characteristic of a clear floor coating. It is behind this fundamental basic safety feature of the coating that other performance characteristics are arrayed in descending order of importance.

Another major problem with relying only on lab tests is that one needs to coat a sufficiently large enough surface of floor before one can see whether there is uniformity in depth and gloss, sufficient open time to prevent lapping. Laboratory tests on small surfaces do not manifest such performance problems. Also panelization occurs in large floor applications but will not manifest itself in laboratory tests alone. (Panelization is when the coatings perform like a glue, and glue separate floor boards together, which then causes them to spilt when the undergo swelling and contraction due to temperature
2-6 and humidity changes.)

Another deficiency in the study's failure to apply and test the floor coatings on large surfaces is seen in floor varnishes below 350 grams. Going to such high solids materials means there will be thicker applications which increases the dry time. In the case of water`bornes there will be more air trapping which will lead to foaming, the full extent of which cannot be fully understood unless there is an actual application to a large area.

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2-6 cont. These resolution of these performance issues are crucial for a coating's acceptability and as we have said time and again, large field application tests are not luxuries but absolutely essential. It is extremely important to note that even if such problems only occur in 5% of the coatings sold, the financial losses for a company would be catastrophic.

2-7 These coatings do not lend themselves to solvents that are not regulated VOCs, such as polyfunctional aziridine (it is a sensitizer with a toxicity profile unsuitable for consumer) and isocyanates (sensitizer) and PCBTF (odor and open flame, like gas water heater, liberates hydrochloric and hydrofluoric acid) and acetone (flammability). The safety and odor issues will prevent their use by consumers and contactors.

2-8 It is unclear why AVES did not perform these tests or provide an explanation of why they did not. Industry peer review was not conducted for the testing program.

2-9 Further, the lumping together of spar varnishes, floor finishes, cabinet coatings varnished lacquers, sanding sealer and clear wood finishes into one category exacerbates this problem because the coatings at issue have greatly differing requirements and exposures for which the simple laboratory tests performed did not adequately test.

Exterior Clear Wood

2-10 Spar varnishes cannot be effectively made at 250 grams per liter. Acrylic or epoxy two components are not an effective low VOC technology. Clear epoxies because they do not weather well – they are subject to UV deterioration. Clear acrylics because the UV gets through and attacks the wood which then causes delaminating of the coating. These problems would manifest themselves in properly conducted exposure tests which were not performed.

STAINS

Interior Stains

2-11 There were no field application tests over large enough areas that would manifest problems with uniformity, appearance, lapping, grain differentiating, and dry times. These performance characteristics are crucial and were not tested for.

2-12 **Stains Exterior**

3

2-12 cont.

The tests here should have included exterior exposure tests and also differentiated among substrates, with red wood cedar and treated pine decks, etc., requiring more scrutiny for performance when low VOC waterbornes are applied. Additionally previously weathered wood surfaces in general, the condition of most decks of any age, are more susceptible to water penetration, making the waterborne materials particularly ill-suited for them. No exposure tests were conducted for such previously weathered surfaces.

2-13

Also trafficked horizontal surfaces are more of an issue than vertical surfaces, and there was no differences in testing for these radically different exposures.

2-14

Waterproofing Sealers

Wood

The key performance characteristic is whether the material actually seals the wood and the only way to determine this is through actual exterior exposures. The beading of water in a laboratory test is not an adequate substitute. Also it tells one nothing about the effects of UV exposure on penetrating stains

2-15

Concrete Sealers

Tests required by the DOT were not run and these include the tests for how well the concrete stands up under water exposures and the chemicals that are found in highway environments that can attack the sealers, breaching them and allowing water to entire the concrete. The key here is protecting the concrete from water intrusion. For a clear sealer there must be sufficient UV protection so the coating does not break down. For pigmented coatings the coating must be sufficiently durable to prevent chipping, etc., of the coating. The ideal application is a pigmented coating over a penetrating sealer. None of these important coatings performance characteristics were examined. The acrylic sealers which were lab tested only may have met the lab tests but they would not meet the DOT exposure tests, and would fail in two years if put in such tests. In addition, no real world testing exposures were conducted. Not even laboratory exposures were conducted.

2-16

Sanding Sealers

The lab tests were marginal and apparently highly subjective with the zero VOC getting an "okay" on sandability and gumming.

2-17

ROOF COATINGS

The rule essentially bans effective metallics without providing any justification other than by fiat saying adequate substitute exist. In doing this the SCAQMD does not address the proven longevity of the coatings, their ability to be put

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2-17 cont. down in terrible weather conditions, and their ability to go over less than perfectly prepared surfaces. A water borne equivalent at the low VOC limits proposed liter does not exist. The aluminum pigmented coatings at this VOC level will simply put down a thin layer of flakes that at most will bond with the underlying asphalt but not interconnect with each other because there is insufficient solvent to a permit a resin that would effect this. Also one cannot use PCBTF as exempt an solvent here because it does not bind with asphaltic material. Additionally water borne aluminum coatings have a limited shelf life because water eventually penetrates to aluminum flakes and causes hydrogen gas formation which will explode the can.

2-18 **Failure to Take Account of Industry Comments That Oppose the Limits:** Industry representatives have participated in a number of meetings with the SCAQMD staff and also have provided written comments. The record relied upon for the DEA, however, reflects that only those comments supporting the limits were given any heeding.

2-19 **Errors In Selection of Materials as Representative of Effective Coatings the Meet the Proposed Limits:** A glaring example of this is seen in one of the coatings cited by the SCAQMD as an effective low VOC concrete sealer coating, PROSOCO's Concrete Science ToughCoat PS.

The following information about this coating has been provided by Prosoco, and NPCA member company.

> "PROSOCO's Concrete Science ToughCoat PS is a polysilicate based concrete densifier designed for use in a very narrow application with a limited range of performance characteristics. The product works by binding with the concrete substrate and filling surface pore space. When applied properly, treated concrete will have additional resistance to some chemicals and limited water repellency. In typical applications, it is applied in excess and then buffed to achieve a glossy finish.
>
> ToughCoat PS is designed for use on interior, slick-troweled concrete, such as a warehouse floor. The product may cause significant appearance change on a broom finished or rough surface concrete. It is not designed for use on vertical concrete of any description, nor will it work on any other masonry substrate.
>
> As listed on the Product Data sheet, ToughCoatPS does impart some water repellency to a properly treated concrete. The published absorption rate reduction per ASTM C462 is 75% of control. This represents a marginal increase over the natural porosity and permeability of a dense concrete. As a matter of perspective, the minimum acceptable industry standard for water absorption rate reduction in a treated concrete is 80% of control. Architects typically

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specify a reduction of 90% or higher which is typically achieved by a variety of penetrating resin technologies.

2-19 cont.

Again, this is a product designed for a very specific and limited application. It does one job well, but is by no means a performance coating. PROSOCO was surprised to find this product listed on Appendix A to SCAQMD's proposed Rule 1113 changes. It is apparently being used as an example of a product that meets or exceeds the targeted low VOC standard for the Waterproofing Concrete/Masonry Sealers category. While it is compliant, its performance characteristics render it unsuitable for the majority of horizontal and vertical concrete surfaces encountered in the built environment. It is inconceivable to PROSOCO that this one product and a handful of other penetrating and film forming products on the market could be used to justify regulation of all specialty products used on the one hundred or so identified common substrates and finishes."

(See Appendix below for additional comments made by PROSOCO.)

Other manufacturers have made similar comments about the coatings relied upon by SCAQMD to justify the proposed limits both in writing and in oral statements at the SCAQMD meetings.

2-20

Concluding Comment: We appreciate the opportunity to comment on the DEA and we ask that our comments be given serious consideration. The DEA's justification for requiring a VOC reduction of nearly 70% from the coatings at issue is insufficient, in major part because the underlying information and record it relies upon ignores or assumes away crucial information which demonstrates the serious performance issues with coatings at the proposed limits. Essential performance tests have not been performed and reliance is placed on a limited number of coatings in the market or under development as being suitable to meet the all of the performance and application requirements of the entire coatings categories. We believe that the rulemaking should be delayed in order to allow industry to more fully address these deficiencies in the record of a proposal that was first presented in mid-August.

Sincerely,

Jim Sell
Senior Counsel

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Appendix

From: Dwayne Fuhlhage [mailto:dfuhlhage@prosoco.com]
Sent: Wednesday, October 08, 2003 2:09 PM
To: Bob Nelson
Cc: Jason Netherton; David Cummins; Fran Gale
Subject: PROSOCO Substrate List 10-2003.xls

Bob, we are working on putting some comments together for you. We'll do what we can in the time allotted.

I received the AVES report this morning and am going over it. Just how much of their future strategy are they hanging on this? I am up to 5-1 and have found very little reference to use on concrete and masonry substrates. The one test they mention in passing is for concrete and it does not state how the product has been applied. From our perspective, the following crucial information has been omitted in their testing:

For exterior concrete:

Concrete finish (smooth, brushed, exposed aggregate)
Application method and coverage rate
Was this on green concrete (<28 days old) or old concrete (pH stability makes a big difference on green concrete due to alkalinity; many water carried emulsions are unstable or will not react with alkaline concrete)
How is the UV stability over time (normally use weather chamber per ASTM-G154?
What is the slip resistance of the product on exterior, horizontal substrates per ASTM-C1028?
What are the chloride screening capabilities per:
NCHRP 244 Series IV
AASHTO T259/260
(refer to our Product Data for Saltguard WB on our website)

2-21

These are off the top of my head. Additional study by our technical people may turn up a few more issues.

From a more general perspective, it is hard to conceive how they can derive a 50 or 100 g/L standard for ALL masonry substrates based on the Waterproofing Sealer WPS-2. A film forming material is not appropriate in many cases. Very few film formers will work for road maintenance departments that have to deal with chloride issues from de-icers or proximity to the ocean. I don't see any real methodology for how they tested the product. Interior or exterior? Horizontal or vertical?

After all of our R&D on low VOC products, it is hard for us to believe that anyone has truly come up with zero VOC products as listed in the AVES report. I think it would be fair to see the same calculation sheets that industry has to turn in to CARB, especially since their limited testing leads them to regulating an entire industry.

One thing that strikes me about the proposed rule and the AVES report is that there is no recognition of just how many masonry substrates there are. Hence the attachment of the types of substrates our products are applied on. I also note that Appendix A has no listing of substrate limitations (interior/exterior, wet surfaces, UV stability, pH stability, chloride screening, type of masonry substrate) or final appearance. You don't put a film forming varnish on a sandstone. Some stain resistant concrete densifiers (like our Tough Coat PS in Appendix A) impart no water repellency and vice versa. None of the penetrants or standard varnishes do anything in the way of providing water repellency to concrete block, which is a current favored building material. For that you need a long molecule such as RTV which cannot be carried in water. Most of the penetrants that work on concrete are incompatible with natural stone with low silica content- that uses a different resin technology which currently is incompatible with water. Consolidation treatments for natural stone are an entirely different beast, but is still lumped in with their generic classification.

The list goes on and on.

2-21 cont.

We won't have it done for you this week, but we are intending to create a cross-reference spreadsheet that shows all of the various substrates and the coating technologies that are appropriate for each one. We'll include limitations for each technology. We'll need to work with you on what kind of formal comments will best help NPCA in future litigation.

One thing that might help you get a handle on the variety of substrates and technologies is by looking at the project reference database on our website. It includes the actual laboratory reports we have created when material comes through our lab for testing. It is broken down by substrate families and then specific substrates.

One last comment with regards to VOC calculation methods. The proposed rule lists USEPA Method 24 and SCAQMD's Method 304. We have run across CARB Method 310 in our Green Seal product development and are wondering if it would help us at all with product having a high water content. Would requesting that 310 be included as an alternate test method be good for industry? We are going to run the numbers with one of our 15% active penetrants to find out.

That is it for now. We'll pass on more as we come up with it.

Dwayne

COMMENT LETTER #2 FROM
THE NATIONAL PAINT AND COATINGS ASSOCIATION (NPCA)

(OCTOBER 24, 2003)

Response to Comment 2-1

The SCAQMD disagrees with the commentator's opinion that the analysis in the Draft Environmental Assessment is "fatally flawed." The Environmental Assessment analyzes the adverse impacts As required by CEQA Guidelines 15070(a). According to the CEQA Guidelines §15021(b), "in deciding whether changes in a project are feasible, an agency may consider specific economic, environmental, legal, social and technological factors." However, CEQA Guidelines also states "Economic and social changes resulting from a project shall not be treated as significant effects on the environment" (CEQA Guidelines §15064(e)). Lowering the VOC content limits in coating formulations will not physically change the architectural coating procedure or structures being painted. Furthermore, the proposed amendments to Rule 1113 are considered to be technologically feasible because compliant coatings in the categories where the VOC content limit will be reduced, are currently available as indicated in Appendix B of the Environmental Assessment. Specific responses to the commentator's opinions on the quality of the environmental analysis are provided in the following responses to comments.

Response to Comment 2-2

The SCAQMD staff has provided adequate time and information for other public agencies and members of the public to review and comment on the Draft EA. Staff has kept industry involved in the rule development process, provided the scope of the proposal to industry, including amendments to specific coating categories, at earlier working group meetings held on March 20, 2003, May 6, 2003, and July 16, 2003, and to the public and other public agencies prior to August 2003. Staff also provided substantial time for industry to provide input at each step in the amendment process, including the requirements of the proposal prior to issuing the August 2003 version of the rule. SCAQMD staff disagrees with the commentator's rulemaking characterization of late and last minute exchange of information etc. Reasons for changes to the project description and the rule stem from resolving issues raised by the public and industry representatives. In the meantime, the SCAQMD has complied with the legal requirements and continues to work with interested parties in the rule development process. The 30-day review and comment time period is consistent with the CEQA Guidelines §15105(b), which states that the public review period for a CEQA document with no significant adverse environmental impacts "shall not be less than 20 days." Based on input from the public, however, the rulemaking period was extended by an additional 30 days period to provide more time to industry for an exchange of information. This extension was granted so that staff could obtain additional information from the commentator. However, staff has repeatedly requested studies from the commentator and its member companies that provide empirical data to validate comments provided by the industry. To date, the SCAQMD has not received any such information from the commentator.

Response to Comment 2-3

While the Draft EA references the AVES study as a study of side-by-side comparison testing of the coatings affected by the proposed amendments, it is not the only evidence to support the conclusions in the Draft EA nor meant to be all-inclusive, but rather a relative performance comparison of solvent-borne and waterborne coatings. Case studies by USEPA and Midwest Research Institute, as well as performance data and product data sheets from coating manufacturers compiled under Appendix B of the EA provide further evidence of the availability and use of these compliant coatings. Furthermore, Chapter II, Table 1 of the staff report summarizes market penetration data for sales of these products in the Year 2000 for each of the categories included in the current proposal. In the three years subsequent to the year 2000 data, staff anticipates that the market penetration data probably greater for each of the categories, based on the findings of the Annual Status Reports, as well as the presence of compliant products listed in Appendix B and not included in the CARB survey.

Response to Comment 2-4

The AVES Study was designed to assess the most common performance characteristics, based on the type of testing conducted and reported for the coating categories on their technical data sheets. While Taber Abrasion is commonly conducted by manufacturers of clear wood coatings used on floors, it is not the only test. A review of some of the performance information obtained from the coating manufacturer, Bona Kemi, clearly indicates the use of Taber Abrasion as a key test. Specifically, their technical data sheet indicates that “The Taber test, the most commonly accepted standard lab test for durability, evaluates the resistance of a material to abrasion. For hardwood floors, this equates to evaluating wear.” Additionally, information provided by Bona-Kemi indicates that their clear waterborne wood floor coating with a VOC of 240 g/l, as tested by SGS U.S. Testing Co, indicated twice the durability than the nearest competitor, which included oil-modified finishes, as tested under the Taber Abraser Grit Feeder Test. Staff agrees that actual traffic tests should also be examined to assess actual performance characteristics of polymers. Staff did so by reviewing data collected by Bona-Kemi on testing that began in 1993 by the Wood Sciences Department at the Colorado State University. Test panels of hardwood flooring with wear-through lines were coated with finishes according to manufacturers’ specifications and placed in busy university hallways. As a part of the study, all panels are rotated periodically to ensure even wear patterns. Year-around traffic from faculty and students with hiking boots, rollerblades, skateboards, bicycles and pets tracking in water, snow, salt and dirt, provides a true ‘real-life’ durability test. These test panels are rated in terms of wear-through, scuff, scratch, and chemical resistance, as well as overall visual appearance. These real-life tests have confirmed the laboratory testing using the Taber Abrasion testing, and have concluded that the waterborne formulation by Bona-Kemi are the most durable available, as compared to other solventborne and waterborne finishes. These products by Bona-Kemi have been used on numerous residential and commercial uses, including large areas. One such location is the Barneys of New York store in Beverly Hills where more than 5,000 square feet of maple wood coating was applied.

Response to Comment 2-5

Coefficient of friction test (which determines probability of slips and falls on coatings) was not specifically a part of the AVES Study, but is a performance characteristic evaluated by the SCAQMD staff. Bona-Kemi's Traffic™ product is classified by Underwriters Laboraties, Inc., as a slip resistant coating. There are already existing compliant coatings in each of the categories affected by the rule amendment. Thus, these formulations, which have already been tested, may be used safely.

Response to Comment 2-6

As indicated in Response to Comment 2-4, Bona-Kemi's products have been successfully applied over large areas without any panelization issues in residential and commercial environments. Staff also disagrees with the commentator's assertion that lower-VOC finishes have longer dry times. The AVES Study, as well as performance data from Bona-Kemi clearly indicates that the waterborne products actually dry and cure faster than their solvent-borne counterparts. In conclusion, there are products in the marketplace that do not have the specific issues cited by the commentator.

Response to Comment 2-7

Safety and odor issues prevent certain solvent usage for all coating formulations, not just architectural coatings. If there are toxic ramifications from any compounds, whether formulated in a waterborne coating or a solvent-borne coating, the manufacturer has to consider the ability to use a coating as well as the safety issues to the consumer and contractor. The Bona-Kemi products discussed in earlier comments, as well as other products listed in Appendix B, do not have the specific issues listed by the commentator, and are regularly used by the professional applicator and the consumer. Typically, solvent-borne products, especially clear wood finishes, have more toxic solvents (e.g., toluene, ethyl benzene, etc.) than solvents found in waterborne formulations, as shown in chapter 2 of the EA.

Response to Comment 2-8

As indicated earlier, the AVES Study was designed to assess the most common performance characteristics, based on the type of testing conducted and reported for the coating categories on their technical data sheets. Also as indicated earlier, staff did not rely solely on the results of the AVES Study, but also relied on data obtained from manufacturers and other sources. The AVES Study was performed by a third-party contractor with expertise in coating development and evaluation, selected as a result of a Request for Proposal. The expertise of the contractor did not require an additional peer review.

Response to Comment 2-9

Please refer to Response to Comments 2-4 through 2-8. While staff recognizes the numerous uses of clear wood coatings, Appendix B lists a variety of clear wood coatings that can be used for each of the listed uses. As indicated earlier, the AVES study evaluated typical coatings performance characteristics and should not be considered "all inclusive" since each manufactures different characteristics for the same coating type.

Response to Comment 2-10

The SCAQMD staff disagrees that exterior products using an acrylic or epoxy resin cannot have UV-resistance. In the AVES Study, there is a detailed assessment of the modified epoxy resin that shows the best UV resistance. Furthermore, Appendix B includes numerous products that can be used to replace the traditional spar varnishes, including urethane products by JFB Hart and Epmar. The SCAQMD has used these zero-VOC polyurethane coatings on exterior substrates for the past five years. These wood substrates have indicated excellent gloss retention and film appearance.

Response to Comment 2-11

Although the interior stains included in the AVES Study performed well in the laboratory environment, as well as the case study, the current proposal does not lower VOC limits for interior stains.

Response to Comment 2-12

The SCAQMD staff disagrees with the commentator's opinion expressed in this comment. The AVES Study did include a thorough assessment of exterior semi-transparent and opaque stains, concluding that the zero-VOC products performed better for UV resistance, as tested under ASTM G53-88 on both redwood and cedar. Nevertheless, the staff recognizes the industry desire to conduct additional real time exposure studies for exterior stains, and has therefore modified its initial proposal and proposed a 42 month implementation period to allow for the completion of the reformulation and exterior field testing. Furthermore, the semi-transparent urethane-based coatings available today are excellent substitutes for both horizontal and vertical surfaces and can be used as exterior semi-transparent stains and have been used on new and previously painted substrates, including wood decks. JFB Hart products have been used on an exterior wood deck in Chicago that was previously coated with a solvent based semi-transparent stain over two years ago without showing any wear.

Response to Comment 2-13

Please refer to Response to Comment 2-12. As indicated in earlier responses, the AVES study is not "all inclusive" and the SCAQMD has relied on assessment of commercially available products and their actual performance in the field. Appendix B and the staff report lists several exterior deck stains. Okon Company manufactures and sells a product called DECK STAIN, which is a water-based water repellent and wood stain for horizontal wood applications. This product is designed for decks constructed with milled, pressure-treated, and rough lumber. ASTM testing results show that this product performs equally or better than its higher-VOC counterparts. For example, this product passes the QUV 1,000 hour test for ultraviolet light resistance, as well as ASTM D3359-90 for vapor transmission. The VOC content is approximately 100 g/l. Columbia Paint & Coatings manufactures and sells the Woodtech Solid

Color Pre-Stain (09-870), a low VOC (62 g/l) interior and exterior stain for bare wood substrates. The technical information from the manufacturer indicates "excellent color retention, good penetration, and recoat properties." The company representative indicated that this product forms a hard film that is abrasion resistant. Epmar Corporation also manufacturers and sells a variety of low-VOC stains, including pigmented, clear, and semi-transparent. The Kemiko Transparent Stain is a single component product recommended for use on concrete, plaster, polymer cement, and wood. Applications include walkways, decks, hospitals, schools, shopping malls, restaurants, and theme parks. The VOC content is less than 30 g/l. Furthermore, detailed evaluations were conducted by Consumer Reports Magazine (June 2002 and August 2003), on clear, semi-transparent, toned, and opaque stains used on horizontal surfaces such as decks. The conclusion from the August 2003 article indicates that opaque stains, mainly due to the higher pigment content, last the longest, typically more than three years, whereas "a semi-transparent finish may need to be reapplied every two to three years. The conclusion also indicates that clear deck finishes don't last more than one year (for both high VOC finishes as well as low-VOC finishes)." Nonetheless, based on the comment, staff has revised the final compliance date for stains to July 1, 2007, thus, providing more time for additional development and testing. Additionally, this category is included in the future technology assessment, where specific characteristics could be assessed.

Response to Comment 2-14

The AVES Study analyzed the typical characteristics for waterproofing sealers for wood. Appendix B, as well as the staff report, lists numerous waterproofing sealers, indicating their performance characteristics well beyond beading of water. These products indicate good performance on water sealing. It should be noted that the largest manufacturer of waterproofing sealers for wood uses beading of water as a marketing tool.

Response to Comment 2-15

Although the AVES Study did not specifically analyze typical Department of Transportation (DOT) or National Cooperative Highway Research Program (NHCRP) tests, staff evaluated numerous products that comply with the proposed VOC content limits for this coating category and that meet the DOT requirements and the NHCRP requirements. These are discussed in detail in the staff report, as well as included in Appendix B. Therefore, there are available compliant products that meet the DOT requirements, such as L&M's Aquapel Plus waterproofing concrete/masonry sealer, Rainguard's Blok-Lok clear water repellant, and Poly-Carb Mark-163 Flexogrid (2-component).

Response to Comment 2-16

The AVES Study did show the sandability of the zero-VOC sanding sealer to be okay. However, the KCMA data and USEPA Case Studies Reports, as well as SCAQMD's Technology Assessment Report for Rule 1136 – Wood Coatings, all indicated the successful use of waterborne sanding sealers, with a VOC content of 250 g/l to 275 g/l. Therefore, the proposed limit is established at 275 g/l.

Response to Comment 2-17

Because of the chemical solvency of solvent-based coatings to dissolve dirt and other contamination, they are more "forgiving" in application than waterborne coatings. Staff recognized this problem by avoiding any VOC content reductions on bituminous roof primers. With the application of solvent-based primer to bituminous roofing materials, any surface can be prepared to accept basecoats and subsequent topcoats. Metallic roof coatings with VOC contents of 500 grams per liter are excessively high, particularly in light of the availability of waterborne aluminum roof coatings that can be formulated with VOC contents at or below 100 grams per liter. Upon further consideration to address concerns that aluminum coatings need more solvent, staff is recommending a separate category for aluminum roof coatings and setting a lower limit consistent with the lowest VOC containing waterborne aluminum roof coating emulsions, consistent with Title 24 for roof additions, alterations, and repairs (0.30 reflectivity) and opening the possibility of new aluminum roof coatings to achieve the high standards for new construction of the California energy code. A definition of aluminum roof coatings has been added as well, setting the elemental aluminum content to 0.7 pound of elemental aluminum per gallon of coating. The SCAQMD is aware that during storage waterborne aluminum coatings may be prone to chemical reactions that produce hydrogen and aluminum oxide stoichiometricly and the rate of reaction is accelerated by the addition of heat. Excessive pressure buildup and oxidation of the aluminum flake have been minimized through proprietary additives that slow this reaction. United Coatings, manufacturers of waterborne aluminum coatings, indicate that several drums of aluminum coating have been in storage for three years without excessive pressure buildup issues. If little hydrogen has been produced in three years with the chemical additive, it is necessarily true that little oxidation has also occurred. Most waterborne aluminum roof coatings are purchased in bulk and professionally applied within a short period of time, so that chemical reactions are not a concern. In the case of consumer use and storage of waterborne aluminum roof coatings, a pressure relief valve is installed on the containers sold to consumers, which ensures that pressure build-up will not occur. White reflective coatings are typically marketed to consumers. Lastly, Rule 1113 contains a specialty coating category called Bituminous Roof Primers that have a VOC limit of 350 g/l. At this time, staff is not proposing a lower limit for these bituminous roof primers

Response to Comment 2-18

The SCAQMD staff disagrees with the opinion of the commentator that the Draft EA reflected only the comments supporting the limits. As noted in Response to Comment 2-2, the SCAQMD provided substantial opportunities to provide comments through working group meeting, public consultation meetings, etc. The SCAQMD also extended the period for providing comments on the staff proposal by 30 days. Also as noted in Response to Comment 2-2, when asked to provide empirical data to support comments made by the regulated industry, such data or other information was not provided.

Response to Comment 2-19

Staff recognizes that there are a variety of waterproofing sealers and waterproofing concrete/masonry sealers, and that formulations cover specific different uses. Appendix A of the Staff Report and Appendix B of the EA list a large number of compliant products that represent a variety of uses, including concrete driveways, pool decks, vertical concrete block walls, concrete tilt up walls, and exposed aggregate. The list also includes products recommended for above-grade and below-grade, as well as interior and exterior uses. There are also several penetrating sealers that meet the DOT requirements, as tested under the NCHRP 244 tests (see Response to Comment 2-15). The AVES study includes a side-by-side comparison of acrylic, alkyd, and epoxy-based sealers that clearly shows the superior performance of the zero-VOC epoxy-based waterproofing concrete/masonry sealer compared to the alkyd- and acrylic-based sealers. Lastly, the availability and use of these products clearly demonstrate that these products perform well, especially since they are being used in the absence of any regulatory requirements with such low VOC limits.

Response to Comment 2-20

Comprehensive responses have been prepared for all comments received on the Draft EA. The commentator, however, should be aware that the role of the EA is to analyze potential adverse environmental impacts from the proposed project, which includes reducing the VOC content limits for specific coating categories. Data and other technical information that support staff's proposal to reduce the VOC content of selected coating categories can be found primarily in the Staff Report for the proposed project. Information on the availability of coatings that currently comply with the proposed VOC content limits can also be found in Appendix B of the EA. With regard to specific issues raised by the commentator, please refer to the responses to comments above.

Response to Comment 2-21

Staff recognizes that there are a variety of waterproofing sealers and waterproofing concrete/masonry sealers, and that formulations cover specific different uses. Appendix A of the Staff Report and Appendix B of the EA list a large number of compliant products that represent a variety of uses, including concrete driveways, pool decks, vertical concrete block walls, concrete tilt up walls, and exposed aggregate. The list also includes products recommended for above-grade and below-grade, as well as interior and exterior uses. There are several penetrating sealers that meet the DOT requirements, as tested under the NCHRP 244 tests. The AVES study includes a side-by-side comparison of acrylic, alkyd, and epoxy-based sealers that clearly shows the superior performance of the zero-VOC epoxy-based waterproofing concrete/masonry sealer compared to the alkyd- and acrylic-based sealers. The availability and use of these products clearly demonstrate that these products perform well, especially since they are being used in the absence of any regulatory requirements with such low VOC limits.

One example of a compliant waterproofing concrete/masonry sealer included in Appendix A of the Staff Report and Appendix B of the EA is Flexogrid™ (MARK-163), manufactured by POLY-CARB, is a zero-VOC urethane-epoxy copolymer recommended for use on bridge decks, parking decks, highway on and off-ramps, and weather-exposed concrete structures requiring waterproofing and skid-resistant qualities. It also has flexibility to accommodate minor movements of the substrate such as vibrations, thermal shock, freeze and thaw cycles, expansion or contraction due to weather. This is a film-forming coating that protects the concrete from water absorption and chloride ion permeation. This product is formulated to provide good abrasion resistance, tensile elongation, and skid number. Listed below are results from tests performed by independent laboratory:

Tensile Strength	ASTM D638-82	>2,500 psi
Tensile Elongation	ASTM D638-82	35±5
Shore D Hardness	ASTM D2240-75	65±5
Abrasion Resistance - Wear Index	ASTM C-501	75-85 mg
Water Absorption Max.	ASTM C-570	0.2%
Chloride Ion Permeability	AASHTO T277	200 coulombs avg.
Skid number	ASTM E 524	40-45 avg.

As of 1999, Flexogrid has been used by Department of Transportations in Ohio, N. Carolina, Alabama and Illinois State among others, in over 110 transportation projects in both the United States and Canada.

COMMENT LETTER #3

CURTIS COLEMAN, ESQUIRE

Comments of The Sherwin-Williams Company
on the
Draft Environmental Assessment for PAR 1113

The Sherwin-Williams Company has reviewed the DEA for PAR 1113 and believes that the discussion of the "more frequent recoating" issue is inadequate as it pertains to exterior stains. Sherwin-Williams has advised the SCAQMD staff on numerous occasions during the development of these rule amendments that a 100 gram per liter limit for semi-transparent exterior stains will not allow the production of semi-transparent stains suitable for use on horizontal surfaces subject to wear and abrasion, such as concrete driveways and patios, and wooden decks. Semi-transparent stains for these uses must be formulated with harder resins that can withstand the wear that vertical surfaces (e.g., siding) are not exposed to. These harder resins require more coalescing solvent than the softer resins. The additional coalescing solvents in an otherwise waterborne formulation require a regulatory VOC limit of 250 grams per
3-1 liter.

The product listings prepared by SCAQMD staff support this conclusion. Virtually all of the stains recommended for horizontal surfaces such as decks have VOC contents over 200 grams per liter. In our experience, semi-transparent stains with VOC content at or less than 100 grams per liter lack the durability for use on horizontal surfaces, or require a topcoat to provide that durability. If a semi-transparent stain lacking durability is used, additional VOCs will be generated by the need for more frequent recoating, thus negating the anticipated benefits of the rule. Likewise, if an additional topcoat is required to provide the durable finish, more VOCs will be emitted than would be the case if a durable stain were used in the first instance.

Sherwin-Williams was not the only manufacturer to
3-2 raise this issue during the rule development process, thus we were surprised to see that no discussion of this issue was incorporated into the DEA.

Curtis L. Coleman
Law Offices of Curtis L. Coleman
6601 Center Drive West Ste 500
Los Angeles, CA 90045

COMMENT LETTER #3 FROM
CURTIS COLEMAN, ESQUIRE

(OCTOBER 24, 2003)

Response to Comment 3-1

Appendix A and the Staff Report and Appendix B of the EA list several compliant exterior deck stains. Okon Company manufactures and sells a product called DECK STAIN, which is a water-based water repellent and wood stain for horizontal wood applications. This product is designed for decks constructed with milled, pressure-treated, and rough lumber. ASTM testing results show that this product performs equally or better than its higher-VOC counterparts. For example, this product passes the QUV 1,000 hour test for ultraviolet light resistance, as well as ASTM D3359-90 for vapor transmission and is considered to be as durable as some of the higher VOC exterior stains. VOC is approximately 100 g/l. Columbia Paint & Coatings manufactures and sells the Woodtech Solid Color Pre-Stain (09-870), a low VOC (62 g/l) interior and exterior bare wood substrates. The technical information from the manufacturer indicates "excellent color retention, good penetration, and recoat properties." The company representative indicated that this product forms a hard film that is abrasion resistant. Epmar Corporation also manufacturers and sells a variety of low-VOC stains, including pigmented, clear, and semi-transparent. The Kemiko Transparent Stain is a single component product recommended for use on concrete, plaster, polymer cement, and wood. Applications include walkways, decks, hospitals, schools, shopping malls, restaurants, and theme parks. The VOC content is less than 30 g/l. Furthermore, detailed evaluations were conducted by Consumer Reports Magazine (June 2002 and August 2003) on clear, semi-transparent, toned, and opaque stains are used on horizontal surfaces such as decks. The conclusion from the August 2003 article indicates that opaque stains, mainly due to the higher pigment content, last the longest, typically more than three years, whereas "a semi-transparent finish may need to be reapplied every two to three years. The conclusion also indicates that clear deck finishes don't last more than one year. However, these conclusions were true for higher VOC stains as well as low VOC stains. Nonetheless, based on the comment, staff has revised the final compliance date for stains to July 1, 2007, thus, providing more time for additional development and testing. Additionally, this category is included in the future technology assessment, where specific characteristics could be assessed.

Response to Comment 3-2

SCAQMD staff believes there were durable compliant exterior stains available at the time of the release of the Draft EA, thus a general durability discussion was included in the Draft EA. Rule 1113 requires a technology assessment to re-assess the performance characteristics, including durability. Stains are included in this assessment and if there are performance concerns with currently available compliant exterior stains for horizontal surfaces and there are limited possibilities of the development of a durable compliant exterior stain in the future, SCAQMD staff will consider a modification to the rule amendment to address this issue.

APPENDIX D

COMMENTS ON THE DRAFT EA AND RESPONSES TO THE COMMENTS

COMMENT LETTER #1

DUNN EDWARDS PAINTS

Dunn-Edwards PAINTS
THE PAINT THAT PROTECTS.®

October 23, 2003

VIA E-MAIL
mkrause@aqmd.gov

Michael Krause
Planning, Rule Development & Area Sources / CEQA
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 East Copley Drive
Diamond Bar, CA 91765

RE: DRAFT ENVIRONMENTAL ASSESSMENT FOR PROPOSED AMENDED RULE 1113 – ARCHITECTURAL COATINGS

Dear Mike:

1-1 Dunn-Edwards Corporation is an employee-owned business with roots going back to 1925. Since that time, Dunn-Edwards has grown from a small, local enterprise into a major regional manufacturer and distributor employing more than 1,300 people. Our facilities include three factories, four warehouses, and more than 70 store locations in California, Arizona, Nevada, New Mexico and Texas. Dunn-Edwards manufactures high-quality architectural coatings that are marketed primarily to professional painting contractors and institutional maintenance accounts, including schools, hospitals, commercial facilities, and public agencies. Our main office and factory complex, as well as many of our store locations, are within the jurisdiction of the South Coast Air Quality Management District ("SCAQMD"). Consequently, Dunn-Edwards has long been interested and involved in air quality regulatory matters affecting architectural coatings within the SCAQMD.

1-2 This letter responds to the SCAQMD Notice of Completion of a Draft Environmental Assessment ("DEA") for Proposed Amended Rule 1113: Architectural Coatings. In its "Description of Nature, Purpose, and Beneficiaries of Project," the Notice explains that the "proposed amendments to Rule 1113…would lower the VOC content limits for…clear wood finishes" [among other categories] and "phase-out the one-quart or less usage exemption for clear wood finishes…." It concludes that "[n]o environmental topic area was identified that could be significantly adversely affected by the proposed amended rule." The DEA does not, however, address the comments offered by Dunn-Edwards at the Public Workshop and CEQA Scoping Session held on Thursday, September 4, 2003, and later summarized in writing in the Dunn-Edwards letter of September 12 to SCAQMD. Those comments deal, in part, with the need to retain the Small Container Exemption as a mitigation measure to offset the potentially significant adverse environmental impacts of the proposed lower VOC content limit for Clear Wood Finishes. Those comments are again summarized and further expanded upon below.

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<u>SMALL CONTAINER EXEMPTION AS MITIGATION MEASURE</u>

1-3 One proposed amendment would exclude Clear Wood Finishes from the Small Container Exemption after a lower VOC content limit becomes effective for Varnish and Sanding Sealers. This would materially impair the usefulness of the Small Container Exemption, since a significant portion of the products supplied under the exemption are stains, sanding sealers, and varnishes (primarily conventional solventborne varnishes), especially those formulated as fine furniture finishes. Technically, these coatings are not subject to regulation under Rule 1113 unless applied to appurtenances that are attached to an architectural structure (e.g., doors, kitchen cabinets, built-in bookcases, or handrails). Nevertheless, the Small Container Exemption has been an important part of architectural coatings regulation from the start, and is currently a feature of every architectural coatings rule in the country.

1-4 The Small Container Exemption serves a number of useful purposes within the context of architectural coatings rules, as has been discussed with the SCAQMD, ARB, and U.S. EPA at various times over the past 25 years. (Enclosed with our letter of September 12, 2003, were copies of correspondence with the SCAQMD, explaining the purposes of the exemption; those enclosures are hereby incorporated by reference.) Not the least of these purposes is that the Small Container Exemption actually makes the rules more effective in reducing VOC emissions, and the elimination or limitation of the Small Container Exemption would result in more emissions, not less. (See EL RAP letter dated July 26, 1996, among the enclosures referenced above.) One issue not previously addressed, but particularly relevant here, is the issue of relative reactivity of VOC solvents used in products that would be supplied under the Small Container Exemption, and in products meeting the proposed new VOC content limit for Varnish.

1-5 The term “reactivity” refers to the ability of a VOC to promote or inhibit ozone formation. (Potential contribution of VOCs to ozone formation is the reason why VOCs are regulated.) Atmospheric chemists have long known that different VOC species have different reactivities, and that relative reactivities may vary by an order of magnitude or more. Current VOC regulations (for the most part) seek only mass reductions of all VOC, without regard to relative reactivity (beyond exempting certain designated “negligably” reactive VOC). Where regulations result in solvent substitutions, however, relative reactivity becomes very important. Emitting smaller amounts of more reactive VOC, in place of larger amounts of less reactive VOC, may not have any beneficial effect on ozone formation, or may even cause more ozone to form, or to form more rapidly so that population-weighted ozone exposures increase.

1-6 The current limit of 350 g/L allows both conventional solventborne varnishes, and alternative waterborne clear wood finishes. According to the most recent ARB survey of architectural coatings distributed in California, waterborne varnishes have a sales-weighted average VOC content of 266 g/L, which is very close to the proposed limit of 275 g/L. In the “Preliminary Draft Staff Report for Proposed Amended Rule 1113,” dated August 19, 2003, SCAQMD staff acknowledges that “[t]raditional varnishes…will not likely meet a proposed limit of 275 grams per liter….” The report also makes it clear that waterborne clear finishes are the most likely substitutes for traditional varnishes.

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A review of manufacturers' Material Safety Data Sheets and Product Information Sheets shows that the VOC solvents used in waterborne clear wood finishes typically consist of various glycol and glycol ether compounds. Below is a table (TABLE 1) showing the most common VOC solvents used in waterborne varnishes, along with their Maximum Incremental Reactivity ("MIR") values, as listed in the table incorporated in the ARB statewide regulation for aerosol coatings (one of the few reactivity-based regulations in operation today). The aerosol coatings
1-7 regulation and table of MIR values, along with related documents, can be viewed on the ARB website at the following location: http://www.arb.ca.gov/regact/conspro/aerocoat/aerocoat.htm

MIR values indicate the amount of ozone that will form, under certain conditions, as a result of the emission of a given amount of VOC (e.g., grams of ozone per gram of VOC emitted). The MIR values of the solvents listed range from 2.56 to 3.36, with an average MIR value of 2.91. This is significantly higher than the average reactivity of the mineral spirits solvents found in traditional solventborne varnishes.

Also given below is a table (TABLE 2) showing a variety of typical mineral spirits (petroleum distillates with average boiling point generally between 340 and 460 degrees Fahrenheit, with aromatics content less than eight percent by weight). These are the VOC solvents primarily used in conventional solventborne varnishes. ARB classifies aliphatic petroleum distillate hydrocarbon solvents into a number of "bins" according to general characteristics of these complex mixtures, and assigns an appropriate MIR value to each bin.

The MIR values of the mineral spirits listed range from 0.81 to 1.62, with an average MIR value of 1.15. Thus we find that, to the extent that lowering the VOC content limit for Varnish from 350 g/L to 275 g/L causes a shift from conventional solventborne varnishes to alternative waterborne clear wood finishes, a decrease of 21 percent in VOC content is accompanied by an increase of 153 percent in VOC reactivity. In terms of relative ozone formation impacts of VOC emitted, substituting waterborne clear finishes for conventional solventborne varnishes will almost double the amount of ozone formed, as calculated below:

$$\frac{275}{350} \times \frac{2.91}{1.15} = 1.99$$

Obviously, adopting a VOC content limit of 275 g/L for Varnish would be counterproductive to the air quality goal of ozone reduction. And excluding clear wood finishes from the Small Container Exemption would only compound the problem, by preventing the use of products that would have only half the ozone forming potential of the allowable complying products. Thus, the Small Container Exemption is necessary to mitigate the potentially significant adverse environmental impacts that would result from adopting the proposed lower limit for Varnish. Our previously stated recommendation is therefore to allow the Small Container Exemption to continue as currently given, without any exclusions or limitations on its operation.

TABLE 1

Solvents Used in Waterborne Clear Wood Finishes

Chemical Name	**CAS Number**	**MIR Value**
Ethylene Glycol	107-21-1	3.36
Ethylene Glycol Monobutyl Ether	111-76-2	2.90
Diethylene Glycol Monoethyl Ether	111-90-0	3.19
Diethylene Glycol Monomethyl Ether	111-77-3	2.90
Dipropylene Glycol Monomethyl Ether	34590-94-8	2.70
n-Methyl Pyrrolidone*	872-50-4	2.56
Propylene Glycol	57-55-6	2.75

* Prop. 65-listed chemical known to cause cancer.

TABLE 2

Mineral Spirits Used in Soventborne Varnishes

1-7 cont.

Description	Criteria	ARB Bin Number	MIR Value
Mineral Spirits, Type I, Class B	Alkanes (2 to <8% Aromatics)	14	1.21
Mineral Spirits, Type I, Class C	Alkanes (<2% Aromatics)	11	0.91
Mineral Spirits, Type II, Class B	(High Flash) Alkanes (2 to <8% Aromatics)	14	1.21
Mineral Spirits, Type II, Class C	(High Flash) Alkanes (<2% Aromatics)	11	0.91
Mineral Spirits, Type III, Class C	(Odorless) N- & Iso-Alkanes (≥90% and <2% Aromatics)	12	0.81
Mineral Spirits, Type IV, Class B	(Low Dry Point) Alkanes (2 to <8% Aromatics)	9	1.62
Mineral Spirits, Type IV, Class C	(Low Dry Point) Alkanes (<2% Aromatics)	6	1.41

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1-8 The discussion of reactivity in the DEA appears to be five to ten years out of date. Curiously, no mention is made of the significant progress in scientific research and regulatory policy over the past decade, including the June 2000 milestone ARB statewide regulation for aerosol coatings. As mentioned above, this regulation establishes reactivity-based standards derived from MIR values. In the ARB Initial Statement of Reasons for the amendments incorporating reactivity criteria (available at the ARB website given above), staff explains:

> "It has been known for several decades that individual VOCs vary in the amount of ozone potentially formed once emitted into the air. This concept is referred to as "reactivity." In the current Aerosol Coatings Regulation, total VOC content is limited on a percent-by-weight basis, without consideration of the differences in VOC reactivity. **However, the science of reactivity now allows us to more effectively control VOC emissions by targeting reductions from VOCs that have a higher potential to form ozone."** (Emphasis added.)

1-9

> "To use the concept of reactivity a method is needed to quantify the impact of each VOC on ozone formation. One tool that allows for ozone measurement is a reactivity scale. Many scales have been proposed to quantify the ozone formation potential of VOCs."

> "Since 1989, [Dr. William P.L.] Carter and co-workers at the Statewide Air Pollution Research Center (SAPRC) (and now continuing at the College of Engineering Center for Environmental Research and Technology)...have been conducting the most extensive studies of incremental reactivities using smog chamber experiments and computer modeling. Carter defines incremental reactivity as the maximum amount of ozone formed by the addition of a test hydrocarbon to the base reactive organic gas mixture, divided by the infinitesimal amount of the test hydrocarbon added."

1-10

> "The MIR, maximum ozone incremental reactivity (MOIR), and equal benefits incremental reactivity (EBIR) are three incremental reactivity scales developed by Carter from box models of 39 U.S. urban areas (selection based on conditions described by the U.S. EPA). Incremental reactivity is expressed as the number of additional grams of ozone formed per gram of VOC compound added to the base organic mixture. **Incremental reactivity conveniently computes the ozone formation potential of a VOC...."** (Emphasis added.)

1-11

> "The MIR is the incremental reactivity computed for conditions in which the NOx concentration would maximize the base ROG reactivity. This scenario is typical in air parcels of low VOC-to-NOx ratios such as urban centers, or air parcels in which ozone is most sensitive to VOC changes. These are typical of urban centers in which there are high emissions of NOx and the chemistry is VOC-limited."

> "Studies have also addressed the appropriateness of using a simplified...box model to quantify the reactivities of VOCs. These studies involved comparing the MIR to other reactivity scales.... The results of these studies indicated that the box model-calculated

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MIR scale, using the SAPRC mechanism, is in agreement with other reactivity scales.... **Therefore, we conclude that the MIR scale provides a reliable description of hydrocarbon reactivities and, therefore, can be utilized for ozone control strategy decisions."** (Emphasis added.)

"For ozone control strategies, the reactivity scale selected should be designed for the best overall air quality benefit. At the request of ARB, Dr. Carter studied 18 different methods (including MIR, MOIR, and EBIR) of ranking the reactivity of individual

1-11 cont.

VOCs.... Dr. Carter concluded that if only one scale is to be used for regulatory purposes in California, the MIR scale is the most appropriate."

"The MIR scale appear to be most accurate for VOC-limited conditions, such as in the South Coast Air Basin, in which VOC controls would be most effective." (Emphasis added.)

"As further evidence of the MIR scale being appropriate for California, the VOC/NOx ratios used for deriving the scale are observed throughout the state of California, including such cities as San Diego, Los Angeles, Sacramento, and San Francisco."

As part of its efforts to validate the scientific basis for using reactivity criteria in ozone control policy, the ARB established in 1996 a Reactivity Scientific Advisory Committee, comprising six eminent experts in the field of atmospheric chemistry: Dr. John H. Seinfeld (California Institute of Technology); Dr. Roger Atkinson (University of California, Riverside); Dr. Jack Calvert (National Center for Atmospheric Research); Dr. Harvey Jeffries (University of North Carolina, Chapel Hill); Dr. Jana B. Milford (University of Colorado); and Dr. Armistead G. Russell (Georgia Institute of Technology). Biographies of the RSAC members are available at the ARB website using the following link: **http://www.arb.ca.gov/research/reactivity/rsac/bios.htm** The ARB Initial Statement of Reasons continues:

"To further validate the use of the MIR scale, at the suggestion of our Reactivity Scientific Advisory Committee (RSAC) and industry, ARB contracted with Dr. William Stockwell at the Desert Research Institute to conduct a review of the base mechanism (SAPRC99) from which the MIR scale is derived. The result of the review was

1-12

encouraging. Stockwell concluded that Carter's mechanism represents "state of the science for air quality models." The RSAC concurred with Stockwell at its October 8, 1999, meeting and found that SAPRC99 represents the most thoroughly reviewed and best documented chemical mechanism available."

"Although the MIR values are calculated using a "state-of-the-science" chemical mechanism, the reactivity estimates of some ROC classes are still uncertain."

"These uncertainties do not need to preclude regulatory development...." (Emphasis added.)

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"The potential of using reactivity as a ROC control approach has also been evaluated…and we believe the scientific foundation needed for using reactivity is well-established and readily available." (Emphasis added.)

In the ARB "Final Statement of Reasons for Rulemaking, Including Summary of Comments and Agency Response," staff confirms that "the ARB is convinced that the science of reactivity is ready for use in regulatory programs." Moreover, "[w]hile ARB staff agrees that the science of reactivity will continue to evolve and improve, the science is sufficiently robust to expand its use in control strategies to control ozone in California. Furthermore, ARB staff worked extensively with the RSAC, comprised of leaders in the field of atmospheric chemistry, to ensure the fundamental science behind staff's work was sound. We also note that members of the RSAC have conducted several studies on the ability of MIRs to predict ozone formation in both urban and regional domains. The results of these studies indicate that the MIR scale can be used to describe VOC reactivity in "real world" situations."

1-12 cont.

In its Resolution 00-22 (June 22, 2000) adopting the proposed amended aerosol coatings regulation, the Air Resources Board finds that:

"VOCs have differing abilities to induce formation of ozone in the air once emitted;

"By understanding the difference in the reactivities of different VOCs, an efficient control strategy can be developed that…limits the ozone formed from…VOC emissions;

"The MIR scale is an appropriate index for quantifying ozone formation of VOCs in California and can be used as the basis for ozone control strategies…." (Emphasis added.)

1-13

To ensure that the regulation would be responsive to the progress of scientific research, the Air Resources Board resolved to direct "the Executive Officer to review the Tables of Maximum Incremental Reactivity (MIR) Values 18 months after the effective date of the amendments, and every 18 months thereafter, to determine if modifications to the MIR values are warranted." ARB staff contracted with Dr. Carter to re-calculate and update the MIR values periodically, most recently in February 2003. Adoption of proposed revised MIR values is scheduled for a public hearing on December 3, 2003, in Sacramento. Of the approximately 670 VOCs or VOC categories listed, for which Dr. Carter re-calculated MIR values, only 26 were adjusted by more than five percent. More than half required no significant adjustment, including the VOC species given in TABLE 1 and TABLE 2 of this letter.

1-14

In summary, to the extent that Proposed Amended Rule 1113 will promote the substitution of waterborne Clear Wood Finishes at 275 g/L for traditional solventborne Varnish and Sanding Sealers at 350 g/L, the best available scientific evidence indicates that ozone formation impacts would almost double. Therefore, continuation of the existing Small Container Exemption, without the limitation proposed, is a necessary and appropriate mitigation measure.

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If you have any questions regarding this letter, or need any further information, please feel free to call me at (323) 826-2663.

Very truly yours,

Robert Wendoll
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cc: Laki Tisopulos
Howard Berman

COMMENT LETTER #1 FROM DUNN-EDWARDS PAINTS

(OCTOBER 23, 2003)

Response to Comment 1-1

The SCAQMD staff appreciates the interest and involvement by Dunn-Edwards in the architectural coating rule making process.

Response to Comment 1-2

The SCAQMD disagrees with the commentator's opinion that the Draft EA did not address previously submitted comments. The analysis in the Draft EA directly responds to previously submitted comments by analyzing the environmental effects of PAR 1113 identified by the commentator. Lowering the volatile organic compound (VOC) content limit for clear wood finishes would not result in a significant adverse air quality impact necessitating a mitigation measure but rather would result in an air quality benefit. According to CEQA Guidelines §15126.4(a)(3), "Mitigation measures are not required for effects which are not found to be significant." On the contrary, retaining the exemption of the quart-size containers of clear wood finishes from the rule's VOC limit would result in a reduction in the benefit to air quality that will occur under the project. Responses to the September 12, 2003 letter to SCAQMD staff can be found in the Staff Report for PAR 1113 which is located in the Final Board Package for PAR 1113.

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Response to Comment 1-3

The small container exemption has been subject to annual reporting in order for the Executive Officer to monitor its use to ensure that this exemption was not overly used. It was never intended as a means of reducing emissions. SCAQMD staff's research shows that, unlike other coating categories, there has been a significantly high sales volume in small containers for clear wood finishes. Because low VOC products are available, staff no longer believes the small container is needed for clear wood finishes.

For example, the products listed in Appendix B of the Environmental Assessment are all adequate replacements for their higher-VOC counterparts currently sold in small containers. Furthermore, the AVES Study clearly illustrates the ability of the low VOC varnishes, sanding sealers, and lacquers to successfully replace existing high VOC products for initial coating, as well as touch-up and repair. Lastly, the Rule 1136 – Wood Coatings Technology Assessment completed in August 2003 demonstrates the successful transition to waterborne coating systems, including the use of waterborne stains, sanding sealers, and topcoats (varnishes and lacquers), by wood coating facilities. Staff has also collected information that shows that the same products used in the shop are also used in the field. As a result, the lower VOC coatings can be used for the purposes that the higher VOC coatings, currently sold in small containers, are currently being used for. Therefore, there is no need for the products sold in small containers to have a higher VOC limit than the products sold in gallon containers. Based on this information and the fact that air quality in the district is so poor, the assertion that other architectural coatings rules elsewhere in the country have the quart exemption is irrelevant.

Response to Comment 1-4

The SCAQMD disagrees with the commentator's opinion that limiting the small container exemption would increase VOC emissions. Responses to the September 12, 2003 letter to SCAQMD staff can be found in the Staff Report for PAR 1113 which is located in the Final Board Package for PAR 1113. In addition, the EA discusses the issues raised in previous correspondence regarding potential environmental impacts of reducing VOC limits. Please refer to Response to Comment 1-3 for a discussion on small container exemption.

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Response to Comment 1-5

The commentator is incorrect in his assertion that the issue of reactivity has not been previously addressed. This issue was comprehensively addressed in Chapter 2 of the Draft EA. Further, reactivity of VOC solvents has been addressed in the CEQA documents for previous amendments to Rule 1113.

SCAQMD staff disagrees that implementing a lower VOC limit for stains, varnishes, and sanding sealers would be counterproductive to the air quality goal of ozone reduction. Lowering the overall volume of VOC solvents from solvent-based formulations by converting to waterborne formulations will continue to lower VOC emissions, thereby reducing ozone formation in the region. Staff disagrees with the notion that elimination of the small container exemption and the use of waterborne formulations in lieu of solvent-borne formulations will result in the use of solvents with higher reactivity and thus negate any environmental benefits. To begin with, it would be inappropriate to simply take arithmetical averages of the MIR values of some of the solvents found in the solvent-borne formulations and compare them to the MIR values of the waterborne formulations. According to Dr. Carter, "averaging the MIRs of the compounds found in finishes is not the appropriate approach; you need to do weighed averages based on the amounts of compounds actually in the finishes" (e-mail from Dr. Carter to N. Berry, SCAQMD, October, 2003). An additional analysis comparing the typical solvents found in solvent-borne clear wood coatings indicates the presence of solvent species other than glycols. These include toluene, xylene, and ethyl benzene, which all have significantly higher MIR values based on currently-available data. The inclusion of additional VOC species typically found in solvent-borne coatings clearly shows an overall higher average MIR value then with the glycols listed and included in waterborne formulations. Finally, the percent of solvent content found in solvent-borne formulations is much greater than the quantity of solvents found in waterborne coatings, which would make the weighted MIR in solvent-borne coatings greater than the already higher average MIR. One should also note that it is not a forgone conclusion that elimination of the small container exemption will necessitate the switch to waterborne chemistries. Manufacturers will have the option to use VOC exempt solvents and thus retain the basic resin chemistry used in solvent-borne formulations.

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In response to the commentator's and others' recommendation to retain the small container exemption, staff is proposing an alternate amendment that phases out the exemption and in the interim establishes maximum VOC limits for clear wood finishes in those small containers.

Specifically, the small container exemption would be deleted effective July 1, 2008 and in the interim, the maximum VOC limit for varnishes and sanding sealers sold in small containers will be 450 g/l, and 550 g/l for lacquers.

Response to Comment 1-6

Traditional solvent-borne varnish formulations are likely unable to meet the proposed VOC content limit of 275 grams per liter, however, clear wood finishes using waterborne formulations that comply with the proposed future compliance limit are widely available and in use, and are considered to be likely substitute products with good performance characteristics. Appendix B of the Environmental Assessment lists currently available clear wood finishes that comply with the proposed future limit of 275 grams per liter.

Response to Comment 1-7

The commentator takes the position that adopting a VOC limit for clear wood finishes at 275 grams per liter is counterproductive, because, as the commentator claims, the average MIR value of compounds found in waterborne clear wood finishes is significantly higher than the average MIR value for compounds in solvent-borne clear wood finishes. However, as noted by the commentator in Comment 1-5, ozone formation potential is a direct result of reactivity times the quantity of VOC emitted. Whether the limit is counterproductive depends on the quantities of VOCs reduced and substituted, and their reactivities. As will be discussed later, there is considerable uncertainty as to the specific VOC species in both solvent-borne formulations and to a lower extent in waterborne coatings. Given such significant uncertainties, it is speculative to conclude that the low VOC limit for clear wood finishes would result in an air quality detriment. Indeed, the commentator's own numbers show otherwise. Even assuming the commentator's assertion that the average reactivity of waterborne finishes is approximately 2.5 times the average reactivity of solvent-borne finishes (2.91/1.15), there will be a net ozone reduction resulting from lowering the VOC limit because of the substantially lesser mass of VOCs being emitted from the waterborne finishes.

Thus, the proposed regulatory limit of 275 grams per liter for clear wood finishes translates into an actual VOC content of 110 grams per liter for waterborne coatings. As the commentator is aware, a regulatory VOC content is determined by excluding water, which results in a higher number than the actual mass VOC content of the waterborne coatings. However, solvent-borne coatings do not have water, so their regulatory VOC content of 350 grams per liter is the same as their actual VOC content.

Assuming a liter of each type of coating is used, 110 grams of VOC will be emitted from the waterborne finish while 350 grams of VOC will be emitted from the solvent-borne formulation. Again, assuming the commentator's asserted average reactivity values, the ozone formation potential of waterborne finishes is 110 x 2.91 = 320.1 which is still less than solvent-borne finishes at 350 x 1.15 = 402.5. Therefore, the decrease in actual VOC content is not 21 percent (275/350) as the commentator claims but rather 69 percent (110/350). Therefore, using the MIR values provided by the commentator, the waterborne clear wood finishes would reduce amount of ozone by 21 percent, as calculated below:

$$\frac{110}{350}\times\frac{2.91}{1.15}=0.79$$

Moreover, the commentator improperly ignores other key VOC species in solvent-borne clear wood finishes with much higher reactivity values. For example, the commentator only lists mineral spirits as the solvent used in traditional coatings, which skews the data to reflect a low reactivity value. While mineral spirits can be found in traditional solvent-borne varnishes, they are not always the only component of clear wood coating formulations. As noted in Response to Comment 1-5, toluene and xylene have a prominent presence in the solvent-borne formulations, but were not included in the commentator's comparison analysis. According to CARB's "Improvement of Speciation Profiles for Architectural and Industrial Maintenance Coating Operations" (CARB, June 1996), solvent-borne formulations include a wide variety and mixture of alkenes, alkanes and aromatic petroleum distillates that have varying MIR values. Typical clear wood finishes, including sanding sealers, lacquers and varnishes, consist of up to 27 percent toluene and xylene in the solvent-borne formulation based on speciation profiles of lacquers, varnishes and sanding sealers and can consist up to over 100 different VOC species for one coating.

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Furthermore, the commentator's blanket assertion that waterborne finishes are much more reactive than solvent-borne finishes is incorrect. Table 1-1 lists the average reactivity, represented as a MIR value, of the solvents found in traditional clear wood finish formulations. The average reactivity of 3.44 for the solvent-borne formulation is higher than the average reactivity of 2.91 for waterborne finishes as provided by the commentator. The MIR values were taken from CARB's aerosol coating regulation accessed from its website at the following internet address: http://www.arb.ca.gov/regact/conspro/aerocoat/aerocoat.htm.

Table 1-1

Comparison of Reactivity of Solvents Used in Solvent-borne Clear Wood Finish Formulations

Solvents Used In Traditional Clear Wood Finishes	
CHEMICAL NAME	**MIR VALUE**
Toluene	3.97
Xylene	7.45*
Methyl Ethyl Ketone (MEK)	1.49
Ethylene Glycol Ethyl Ether (EGEE)	3.78
Ethylene Glycol Methyl Ether (EGME)	2.98
Mineral Spirits (average MIR value)	1.15**
Naphtha (petroleum distillates)	3.26
AVERAGE MIR VALUE	**3.44**

* - Because commercial xylene is a mixture of three isomers (meta-, ortho- and para-), the MIR value listed is an average of three isomers' MIRs.

**- Average depends on the overall composition of mineral spirits, including the level of straight-chain and branched-chain alkanes and aromatic content, and was included as a value in the commentator's letter.

As noted above, while various types of mineral spirits are used in traditional formulations of clear wood finishes, they are not the only compounds used. Toluene and xylene are also used, along with MEK, EGEE, EGME, etc. It is not an accurate depiction of the conventional solvent-borne coating formulation if the commentator analyzed mineral spirits as the only solvent used. Consequently, the SCAQMD staff disagrees that by substituting waterborne clear finishes for conventional solvent-borne varnishes will double the amount of ozone formed. Using the updated MIR value from Table 1-1 above, reformulating traditional clear wood finishes (at 350 grams per liter actual VOC) to waterborne clear wood finishes (at 110 grams per liter actual VOC) would result in a reduction in the ozone forming potential of the reformulated coating by approximately 73 percent, as indicated by the following equation:

$$\frac{110}{350} \times \frac{2.91}{3.44} = 0.27$$

Further, the commentator's claim that the use of the quart container exemption is to mitigate the adverse ozone impact of the allegedly more reactive waterborne finishes is incorrect. The estimated overall ozone reductions are even greater if one considers the fact that the weighted average actual VOC of the solvent-borne formulations for clear wood finishes is significantly higher than 350 grams per liter since these products are sold in quart or smaller containers which have VOC content at the 450-550 grams per liter range and are exempt from the VOC limit requirements of the rule. Reformulating the higher VOC clear wood finishes into compliant waterborne formulations would result in a reduction in the ozone forming potential by approximately 79 percent, as indicated by the following equation:

$$\frac{110}{450} \times \frac{2.91}{3.44} = 0.21$$

To treat waterborne and solvent-borne solvents equally would be an unfair and overly simplistic assessment or comparison. The analysis should include a weighted-reactivity approach for **all** the solvent species in the formulation. However, in order to calculate a weighted average for all solvent-borne and waterborne clear wood finishes, one would have to collect the speciation data, which varies for each coating formulated and is typically considered proprietary information. The following is a summary of comments and analysis conducted by CARB to demonstrate a more feasible approach of calculating overall ozone formation from two coatings, one waterborne and one solvent-borne:

The commentator states that relative ozone impacts can be determined by comparing two single ingredients from a waterborne and a solvent-borne coating. To provide a complete comparison of the ozone formation potential for two coatings, it is necessary to consider all of the ingredients in the coating and the relative contribution of each ingredient in the coating. Comparing the relative reactivity of two single coating ingredients can identify which ingredient is more reactive on its own, but it doesn't reflect the overall reactivity of a coating because it does not account for the relative mass contributions and it doesn't acknowledge the presence of water and solids. Focusing only on VOCs can make a coating seem highly reactive, even when it contains a relatively small quantity of VOCs.

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Consider the following example for two coatings, one solvent-borne and one waterborne, that both have a VOC Regulatory value of 280 g/l, whereas the actual VOC of the waterborne formulation is significantly lower. These coatings are based on actual products that were reported in CARB's 2001 Architectural Coating Survey, with the data slightly altered to protect manufacturer confidentiality.

Solvent-borne Coating (280 g/l): Reactivity of All Ingredients

n	**Ingredient**	**MIR Value** (g O_3/g TOG)	**$[Wt\%]_i$**
1	Hydrocarbon Solvent (Bin 14)	1.21	19.3
2	Aromatic 100	7.51	1.3
3	Hydrocarbon Solvent (Bin unknown)	1.86	9.2
4	Solids	0	70.2
			Total Wt% = 100%

Waterborne Coating (Regulatory VOC = 280 g/l): Reactivity of All Ingredients

n	**Ingredient**	**MIR Value** (g O_3/g TOG)	**$[Wt\%]_i$**
1	2-Propoxyethanol	3.50	5.7
2	2-Butoxyethanol	2.88	4.4
3	Toluene	3.97	1.0
4	Water	0	37.3
5	Solids	0	51.6
			Total Wt% = 100%

A comparison can be made between the two primary VOCs in each coating: Hydrocarbon Solvent (Bin 14) and 2-Propoxyethanol. If the comparison only includes the MIR values, as demonstrated by the commentator, it appears that the waterborne product is more reactive.

$$\frac{[WB]}{[SB]} = \frac{[\text{2-Propoxyethanol MIR Value}]}{[\text{HC Solvent (Bin 14) MIR Value}]} = \frac{[3.50 \text{ g } O_3/\text{g TOG}]}{[1.21 \text{ g } O_3/\text{g TOG}]} = \mathbf{2.9}$$

However, the appropriate method of comparison, as recommended by Dr. Carter, is to compare the weight fractions of the two predominant ingredients. If this is done, the waterborne product is less reactive.

$$\frac{[WB]}{[SB]} = \frac{[\text{2-Propoxyethanol MIR Value}]*[\text{Wt\%}]}{[\text{HC Solvent (Bin 14) MIR Value}]*[\text{Wt\%}]} = \frac{[3.50 \text{ g } O_3/\text{g TOG}]*[5.7\%]}{[1.21 \text{ g } O_3/\text{g TOG}]*[19.3\%]} = \mathbf{0.9}$$

Lastly, if the weight fractions and the relative MIR values were analyzed for all the listed solvents, the ratio of the waterborne over the solvent borne would be even less, 0.73, which demonstrates the waterborne formulation will have a 27% higher overall reduction in ozone formation.

Response to Comment 1-8

The reactivity discussion in the EA has a similar analysis as in the past because the conclusions have not changed with regard to reactivity. The discussion was updated to include the contract with CE-CERT to carry out an environmental chamber study to assess the ozone and PM formation potential of selected types of VOCs emitted from architectural coatings, etc. The updated reactivity section in the EA included a discussion of funding for additional studies and how the studies will be peer reviewed when complete before generating conclusions or creating new regulatory approaches. Additional information on reactivity is provided in the following paragraphs.

In 1995, the California Air Resources Board (CARB) began the process of investigating using photochemical reactivity as an ozone control approach for consumer products and aerosol coatings as a substitute for the mass-based VOC content limit regulation. It was concluded by CARB staff and industry representatives that it was acceptable to replace the VOC content limits with mandatory reactivity-based VOC limits to provide more regulatory flexibility while efficiently reducing the ozone formed from aerosol coatings. In 1996, the Reactivity Research Advisory Committee (RRAC) approved the use of the maximum incremental reactivity (MIR) scale for use in developing reactivity-based control strategies for aerosol coatings in California. According to the CARB, "the aerosol coating category was chosen for the first consumer product reactivity based regulation because it is a well-characterized, discrete category within the inventory. This will allow us (CARB) to carefully monitor the implementation of the regulation to ensure that this regulatory approach is effective." (CARB, "Final Statement of Reasons for Rulemaking," 2000) Established MIR values are described in a subsequent comment in the commentator's letter, which purports to compare the reactivity of solvents used in traditional solvent-borne varnishes versus waterborne products. Please refer to Response to Comment 1-7 for a discussion on the reactivity comparison.

In general, the commentator provides a simplistic comparison of overall ozone potential from solvent-based formulations compared to waterborne formulations. However, as indicated in the staff report and the existing rule language, the SCAQMD recognizes the potential of reactivity as an alternative ozone control strategy, and recognizes the limitations of currently available data on MIR values, mainly the uncertainty associated with the current data, as published in numerous reports by the experts in the field, in particular Dr. William Carter of CE-CERT. According to Dr. Carter, "there is a minimum of 30 percent uncertainty of even well-standing compounds, and the uncertainties of compounds that have not been studied is greater. The ongoing experiments with representative petroleum distillates should address uncertainties for most solvent-based coatings. For the compounds listed in (R. Wendoll's) Table 1, experiments have been carried out to test the mechanisms for Ethylene Glycol Monobutyl Ether, n-Methyl Pyrrolidone, and Propylene Glycol, but Ethylene Glycol, Diethylene Glycol Monoethyl Ether, Diethylene Glycol Monomethyl Ether, Dipropylene Glycol Monomethyl Either have not been studied, so their MIRs are more uncertain. The MIR uncertainties for these are at least 50 percent and perhaps greater." (e-mail from Dr. Carter to N. Berry, SCAQMD, October, 2003) Because of the uncertainties and lack of all the necessary data associated with the reactivity-based approach, CARB did not recognize this approach as a feasible alternative in the Suggested Control Measure for Architectural Coatings at this time (Final Program Environmental Impact Report, CARB, 2000).

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A state-of-the art reactivity chamber was constructed at the CE-CERT facility at University of California, Riverside. In recognition of the SCAQMD's on-going commitment to evaluating this concept, the SCAQMD has contracted with CE-CERT to further study the reactivity and availability of VOC species most commonly found in waterborne and solvent-based coatings. The scope of the project will focus on assessing the reactivity of VOC species most commonly found in solvent-based and waterborne architectural coatings, including studying ozone reactivities of low volatility solvents and re-evaluating uncertainties resulting from current data and modeling. The SCAQMD project will further explore the potential of the new environmental chamber to investigate availability of the low volatility solvents and coordinate the studies with other availability studies. CARB has a limited pilot program in its Aerosol Coatings rule that allows the use of a reactivity-based control approach. What made the use of the reactivity approach in regulating aerosol coatings feasible was primarily the limited number of solvents used in aerosol formulations. The same does not hold true for architectural coatings, however, which represent one of the largest most complex non-vehicular emission source category. Because there are more categories and formulations, as well as greater number of solvents used in architectural coatings, there needs to be a heightened concern regarding uncertainties with MIR values and, thus, more complexity and higher risks with formulating and regulating. To address these uncertainties, similar to the SCAQMD, CARB has also contracted with CE-CERT to conduct additional studies in an effort to reduce the uncertainty of MIR values. Both the SCAQMD and CARB contracts include additional analyses for some of the solvent species highlighted in the comment letter. Therefore, at this time it is not prudent to regulate VOC emissions based on the ozone-forming potential using currently available MIR data. It should be noted that MIR values have changed twice since their original adoption. As mentioned in Response to Comment 1-17, one revised MIR value was for a compound used in waterborne clear wood finishes. Had a reactivity-based rule been in effect at that time, it would have been amended to reflect the new MIR values, which would have required those coating manufacturers using that compound to reformulate in order to comply with the amended rule. Until adequate, peer-reviewed data are available on the MIR values of these solvent species, especially from the newly constructed chamber, the mass-based regulatory approach continues to be the only proven ozone control strategy.

According to CARB's MIR values, individual VOCs vary in the amount of ozone formed once emitted into the air. In its "Final Statement of Reasons for Rulemaking" (CARB, June 2000), CARB states, "…the reactivity-based Aerosol Coating Regulation does represent a new way of controlling VOC emissions. As such, staff believes that a reactivity-based control strategy should be evaluated on a case-by-case basis and **not automatically applied to other product categories.** Staff does believe the science of reactivity is sufficiently well developed to seriously consider using reactivity in other regulatory programs **as appropriate and necessary**." (Emphasis added) Besides the aerosol regulation, no other regulatory program has adopted the reactivity-based approach. According to its "Staff Report for the Suggested Control Measure (SCM) for Architectural Coatings", CARB "…intends to investigate the feasibility of incorporating mandatory reactivity-based limits into the architectural coatings SCM. Further research into the reactivity of VOCs commonly used in architectural coatings may be warranted, both for VOCs that we currently do not have data for, as well as for VOCs for which we need improved data."(CARB, June 2000) However, CARB rejected the use of the reactivity-based approach as not a feasible alternative in its (SCM) for Architectural Coatings, adopted after the inclusion of the alternative reactivity-based approach on a limited scale in the Aerosol Coatings

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rule. According to the Program Environmental Impact Report prepared for the CARB's SCM for Architectural Coatings (SCH# 99062093, CARB, 2000), the following reasons for rejecting a reactivity approach to regulate architectural coatings were identified:

1. The required inventory of speciated VOC data for each product was not sufficiently provided in order to accurately assess the reactivity of products and therefore, can not establish limits.
2. Some VOCs which are used exclusively in architectural coatings do not have well-established reactivity values.
3. Some of the VOCs needing further characterization are not easily evaluated using present methodologies.
4. In an El Rap concept paper it is acknowledged that not all VOCs used in architectural coatings have been thoroughly studied to reliably assess their reactivity. CARB disagreed with El Rap's suggestion's to use a default value of "one" where the reactivity value is unknown because reactivities of VOCs can vary by more than an order of magnitude.

CARB has also contracted with CE-CERT to conduct additional reactivity studies to reduce the uncertainty of VOC species most commonly found in architectural coatings. While there is merit to this approach, there is no evidence that the goal of reducing ozone is being thwarted by regulating and reducing the VOC content limit of architectural coatings. By comparing typical compounds used in solvent-borne coatings, especially aromatic compounds, to compounds used in waterborne coatings, the overall reactivity is reduced which means the ozone formation will be reduced as well.

Finally, in Response to Comment 1-5, it is noted that the current MIR data have high levels of uncertainty and need to be studied further before consideration for significant policy development regarding controlling regional ozone concentrations. As also stated in Response to Comment 1-5, SCAQMD and CARB have contracted with CE-CERT to conduct additional studies on the MIRs for the most commonly used VOC species in architectural coatings. There are many policy implications involved with adopting the mandatory reactivity-based approach over the current VOC content limit approach, including the burden on the industry to potentially limit usage of specific compounds in order to comply. Similar to determining the VOC content for each coating, the conceptual reactivity-based approach will require the coating manufacturer to mix the compounds with various MIR values and formulate to a value less than the compliant limit. Current testing allows the regulator to test the end product to ensure compliance with the VOC content limit. The reactivity-based approach would require extraction and testing of each compound from the end product to ensure the type and amount of chemical are what contributed to the overall weighted MIR value of the coating. This process could lead to a much more complex regulation. It could also result in the loss of regulatory compliance options such as the averaging provision, restricting manufacturers' product formulation options and eliminating certain product forms. USEPA has already commented in CARB's "Final Statement of Reasons for Rulemaking" that there are enforceability issues that would prevent effective enforcement of the reactivity-based program (CARB, 2000). USEPA has also indicated that a reactivity-based program would require considerably more resources in terms of data collection, maintenance, and analytical measurements than mass-based VOC control programs. In addition, because of industry claims that speciated VOC data are confidential business information, public accountability may be reduced and there may be concerns related to Clean Air Act, section 114(c), requirements for USEPA to make emission data public ("Final Statement of Reasons for Rulemaking," CARB, June 2000). In the same document, CARB acknowledges that existing air quality models may not currently have sufficient resolution to account for complete VOC speciation and, thus, more sophisticated models need to be developed.

If the MIR values change, and they have changed twice since their original adoption in 2000 based on more recent analyses, the coating manufacturers may be required to reformulate their products more frequently in order to comply with a reactivity-based approach. Currently, a VOC content limit regulation allows flexibility to formulate without too much control of individual compounds used in the formulation. The primary limiting factor in the formulation of the coating is whether the compound has toxic properties. This toxicity restriction would apply to all coating formulations whether regulated for their VOC content or ozone reactivity.

SCAQMD staff believes that a reactivity-based approach can be a highly effective regulatory approach provided the necessary analytical, technical and implementation tools are developed. The development of these tools and the elimination of the various implementation and enforcement hurdles are extremely important for the ultimate success of this regulatory approach.

Response to Comment 1-9

CARB has adopted the MIR scale of Dr. William P.L. Carter (2000) as a means of quantifying ozone impacts in its regulations of emissions of VOCs from aerosol coatings. However, as the commentator noted, this is one tool that allows for ozone measurement. There are other methods to quantify the ozone formation potential of VOCs, which produce different results and, thus, generate more levels of uncertainty for the MIR values. In addition, there are other methods to regulate and reduce VOC emissions from various product sources. Dr. Carter continues to review the MIR values to minimize uncertainty. Both the SCAQMD and CARB have initiated research projects with Dr. Carter to better understand the reactivity of the various components used in solvent borne and waterborne formulations and minimize uncertainties in the MIR values.

Response to Comment 1-10

The SCAQMD is aware of reactivity research being performed by Dr. Carter and is following it closely. The SCAQMD has provided comprehensive reasons why a reactivity-based architectural coating rule is not prudent at this time. Please refer to Responses to Comments 1-7 and 1-12 for the specific reasons why a reactivity-based architectural coating rule is not considered to be feasible at this time. In his "Evaluation of Atmospheric Ozone Impacts of Coatings VOC Emissions" presentation (Carter, September 2003), Dr. Carter identified the reactivity research needs for VOCs for architectural coatings. He highlighted that reactivity data are already available for many types of VOCs used in coatings including:

- Data available for representative alkanes, aromatics, alcohols, glycols, esters and a few others, however, not all aspects of mechanisms are adequately evaluated.

He added that reactivity estimates are uncertain for some important types of coatings VOCs such as:

- No data for low volatility compounds such as Texanol®
- Petroleum distillates have large compositional uncertainty and components include unstudied VOCs
- Amines and alcohol amines have very large mechanism uncertainty

Dr. Carter stated that there is a need to develop lower cost reactivity screening and enforcement methods, and concluded that there is uncertainty on how much deposition on surfaces and how other non-atmospheric loss processes are affecting atmospheric availability.

Response to Comment 1-11

In general, the South Coast Air Basin as a whole is considered VOC limited with a relatively low VOC/NOx ratio level, however it varies in degree across the Basin. The box model is a good place for proving concepts such as the performance of a reactive chemical mechanism when subjected to basic changes in parameters. The use of the box is to assess different mechanisms for comparison purposes. The box doesn't typically incorporate any real-time physical characteristics (i.e. transport, dispersion, unique emissions combinations) because it is mostly used to develop a level of performance for a given or standard set of conditions. Reactivity is in effect a simplification of the complex processes that take place in the air. It assigns a single number for the reactivity of a species. This ignores the fact that the reaction rate is influenced by a number of factors. Given that it is a simplification, it would not be wrong to use a simplified model to calculate it. Please refer to Response to Comment 1-7 with regards to the concerns and issues with the SCAQMD adopting a reactivity-based approach to regulating VOC emissions and ozone. In addition, refer to Response to Comment 1-12 with regards to CARB's statement on adopting a reactivity-based control strategy on a case-by-case basis, and as appropriate and necessary. The 2003 AQMP continues the SCAQMD's support for studying reactivity as a basis for regulation, but also indicates that the SCAQMD must continue lowering both NOx and VOC emissions in the district to achieve the ozone standard.

Response to Comment 1-12

The SCAQMD is aware of the work of the RRAC, which was comprised of independent, respected scientists who made their recommendations to CARB on the science related to hydrocarbon reactivity, and that they agreed that the MIR scale, developed by Dr. Carter, "…represents the most thoroughly reviewed and best document chemical mechanism available."

Please refer to Response to Comments 1-5 and 1-7 with regards to the concerns and issues with the SCAQMD adopting a reactivity-based approach to regulating VOC emissions and ozone. In addition, refer to Response to Comment 1-8 with regards to CARB's and USEPA's opinion on adopting a reactivity-based control strategy on a case-by-case basis, and as appropriate and necessary. As indicated in earlier responses, the newly constructed environmental chamber at UC Riverside will allow CARB and SCAQMD to reassess the old MIR values generated from the old chamber. If reactivity-based approach was adopted to regulate architectural coatings prematurely, coating manufacturers would be required to reformulate their product(s) in order to comply with these uncertainties and changing MIR values. The frequency of reformulations would depend on whether the MIR value needs to be changed and how often the scientific studies reveal new information. MIR values have changed twice since the original adoption in June 2000. Elimination of these uncertainties is of paramount importance prior to implementation of reactivity-based regulatory approach. The development of a large scale reactivity-based regulatory approach for architectural coatings in order to ensure or successful implementation, provide the needed certainty for manufacturers and minimize the role of errors in measuring the environmental benefits.

Response to Comment 1-13

As noted in Response to Comment 1-16, coating manufacturers would be required to reformulate their product(s) in order to comply with ongoing changes to the MIR values. While the commentator highlights that 26 out of 670 VOCs required adjustment to the MIR value of more than five percent, changes to the MIR for one compound could be a dilemma for the coating manufacturer because a coating formulation depends on the importance of that compound to the formulation, i.e., the amount used and the availability of effective substitutes. One of the revisions to the original list of MIR values was with a compound, dipropylene glycol monomethyl ether, the commentator listed as a solvent used in waterborne clear wood finishes. If the reactivity-based approach had been adopted to regulate VOC emissions from architectural coatings, coating manufacturers formulating with dipropylene glycol monomethyl ether would need to reformulate to ensure compliance.

Response to Comment 1-14

Please refer to Response to Comment 1-8 with regard to why the SCAQMD does not agree with the opinion of the commentator that ozone formation would double under a VOC content limit regulation. In addition, please refer to Response to Comment 1-2 as to why maintaining the Small Container Exemption is not a mitigation measure.

COMMENT LETTER #2

THE NATIONAL PAINT AND COATINGS ASSOCIATION(NPCA)

October 24, 2003

Mr. Michael Krause
DEA -- AIM Coatings Rule
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, California 91765

RE: DEA for Proposed Revisions to Rule 1113

Dear Mr. Krause:

2-1 The National Paint and Coatings Association (NPCA) is providing the following comments on the SCAQMD's Draft Environmental Assessment (DEA) relating to the proposed of revisions to Rule 1113 that were initially proposed in mid-August 2003.

The chief purpose of a Draft Environmental Assessment is to thoroughly review the environmental impacts, positive and negative, of a proposed regulation to determine whether the regulation results in net gains for the environment. For a variety of reasons set out below we do not believe that the proposed revisions have been adequately evaluated in terms of their costs and technological feasibility. Consequently the findings of the DEA are fatally flawed.

2-2 As noted, the proposed revisions were announced in mid-August and there really has not been sufficient time for industry to fully evaluate the basis for the proposed adoption. This rulemaking has been characterized by late or last minute exchange of information exercises which has made it impossible for industry representatives to adequately review the information provided. Even now as these comments are due, the most recent version of the proposed revisions is not generally available to the public on the SCAQMD web site. As a result, many will not make the deadline for commenting on the DEA. We believe that for this reason and others set out below the rulemaking should be extended.

2-3 The SCAQMD's DEA relies extensively upon the AVES study. Our members reviewed the written report and noted several deficiencies which fundamentally undermine the credibility of the study for purposes of justifying the revised. These are set out below under the various coatings categories at issue.

2-4

CLEAR WOOD COATING

Interior Clear Wood

Taber Abrasion Test is an inappropriate test for clear wood coatings for low VOC thermoplastic coatings because the material softens under the instrument

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and does not powder. Hence the test gives a false impression of durability by the material retaining more weight.

Even for low VOC thermosetting clear coatings which do not have this problem, taber abrasion cannot be relied upon. It can only be a lab test that lets one know that a minimal test has been met that justifies further testing for performance. These additional necessary performance tests are various mar and scuff tests that subject the coating to contacts mimicking actual foot traffic. "Durability" as a practical matter for such coatings (i.e., when it is worn enough to merit resurfacing) is not dictated by the actual remaining film left over time
2-4 cont. but by its appearance. Hence, taber abrasion is not dispositive of this issue; film thickness can still be fairly high when the appearance due to traffic (mars and scuffs) would prompt replacement.

An important practical point ignored by the testing so far is that many of the performance characteristics of polymers used here can only be fully seen under actual scuff and mar tests (foot traffic). Some of the lab tests cited by the SCAQMD such as the pencil scratch for durability do not manifest these performance problems. Hence, manufacturers of low VOC clear floor coatings would not perform such lab tests except for a minimal vetting purpose They would require actual traffic tests before producing a product.

One of these absolutely required test not done by the SCAQMD is the coefficient of friction test which determines the probability of slips and falls on the coating. A coefficient below .5 in the lab test means the coating is too risky
2-5 and would it be reformulated. Acceptable coefficient friction is a sine qua non performance characteristic of a clear floor coating. It is behind this fundamental basic safety feature of the coating that other performance characteristics are arrayed in descending order of importance.

Another major problem with relying only on lab tests is that one needs to coat a sufficiently large enough surface of floor before one can see whether there is uniformity in depth and gloss, sufficient open time to prevent lapping. Laboratory tests on small surfaces do not manifest such performance problems. Also panelization occurs in large floor applications but will not manifest itself in laboratory tests alone. (Panelization is when the coatings perform like a glue, and glue separate floor boards together, which then causes them to spilt when the undergo swelling and contraction due to temperature
2-6 and humidity changes.)

Another deficiency in the study's failure to apply and test the floor coatings on large surfaces is seen in floor varnishes below 350 grams. Going to such high solids materials means there will be thicker applications which increases the dry time. In the case of water`bornes there will be more air trapping which will lead to foaming, the full extent of which cannot be fully understood unless there is an actual application to a large area.

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2-6 cont. These resolution of these performance issues are crucial for a coating's acceptability and as we have said time and again, large field application tests are not luxuries but absolutely essential. It is extremely important to note that even if such problems only occur in 5% of the coatings sold, the financial losses for a company would be catastrophic.

2-7 These coatings do not lend themselves to solvents that are not regulated VOCs, such as polyfunctional aziridine (it is a sensitizer with a toxicity profile unsuitable for consumer) and isocyanates (sensitizer) and PCBTF (odor and open flame, like gas water heater, liberates hydrochloric and hydrofluoric acid) and acetone (flammability). The safety and odor issues will prevent their use by consumers and contactors.

2-8 It is unclear why AVES did not perform these tests or provide an explanation of why they did not. Industry peer review was not conducted for the testing program.

2-9 Further, the lumping together of spar varnishes, floor finishes, cabinet coatings varnished lacquers, sanding sealer and clear wood finishes into one category exacerbates this problem because the coatings at issue have greatly differing requirements and exposures for which the simple laboratory tests performed did not adequately test.

Exterior Clear Wood

2-10 Spar varnishes cannot be effectively made at 250 grams per liter. Acrylic or epoxy two components are not an effective low VOC technology. Clear epoxies because they do not weather well – they are subject to UV deterioration. Clear acrylics because the UV gets through and attacks the wood which then causes delaminating of the coating. These problems would manifest themselves in properly conducted exposure tests which were not performed.

STAINS

Interior Stains

2-11 There were no field application tests over large enough areas that would manifest problems with uniformity, appearance, lapping, grain differentiating, and dry times. These performance characteristics are crucial and were not tested for.

2-12 **Stains Exterior**

3

2-12 cont. The tests here should have included exterior exposure tests and also differentiated among substrates, with red wood cedar and treated pine decks, etc., requiring more scrutiny for performance when low VOC waterbornes are applied. Additionally previously weathered wood surfaces in general, the condition of most decks of any age, are more susceptible to water penetration, making the waterborne materials particularly ill-suited for them. No exposure tests were conducted for such previously weathered surfaces.

2-13 Also trafficked horizontal surfaces are more of an issue than vertical surfaces, and there was no differences in testing for these radically different exposures.

Waterproofing Sealers

Wood

2-14 The key performance characteristic is whether the material actually seals the wood and the only way to determine this is through actual exterior exposures. The beading of water in a laboratory test is not an adequate substitute. Also it tells one nothing about the effects of UV exposure on penetrating stains

Concrete Sealers

2-15 Tests required by the DOT were not run and these include the tests for how well the concrete stands up under water exposures and the chemicals that are found in highway environments that can attack the sealers, breaching them and allowing water to entire the concrete. The key here is protecting the concrete from water intrusion. For a clear sealer there must be sufficient UV protection so the coating does not break down. For pigmented coatings the coating must be sufficiently durable to prevent chipping, etc., of the coating. The ideal application is a pigmented coating over a penetrating sealer. None of these important coatings performance characteristics were examined. The acrylic sealers which were lab tested only may have met the lab tests but they would not meet the DOT exposure tests, and would fail in two years if put in such tests. In addition, no real world testing exposures were conducted. Not even laboratory exposures were conducted.

Sanding Sealers

2-16 The lab tests were marginal and apparently highly subjective with the zero VOC getting an "okay" on sandability and gumming.

ROOF COATINGS

2-17 The rule essentially bans effective metallics without providing any justification other than by fiat saying adequate substitute exist. In doing this the SCAQMD does not address the proven longevity of the coatings, their ability to be put

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2-17 cont. down in terrible weather conditions, and their ability to go over less than perfectly prepared surfaces. A water borne equivalent at the low VOC limits proposed liter does not exist. The aluminum pigmented coatings at this VOC level will simply put down a thin layer of flakes that at most will bond with the underlying asphalt but not interconnect with each other because there is insufficient solvent to a permit a resin that would effect this. Also one cannot use PCBTF as exempt an solvent here because it does not bind with asphaltic material. Additionally water borne aluminum coatings have a limited shelf life because water eventually penetrates to aluminum flakes and causes hydrogen gas formation which will explode the can.

2-18 **Failure to Take Account of Industry Comments That Oppose the Limits:** Industry representatives have participated in a number of meetings with the SCAQMD staff and also have provided written comments. The record relied upon for the DEA, however, reflects that only those comments supporting the limits were given any heeding.

2-19 **Errors In Selection of Materials as Representative of Effective Coatings the Meet the Proposed Limits:** A glaring example of this is seen in one of the coatings cited by the SCAQMD as an effective low VOC concrete sealer coating, PROSOCO's Concrete Science ToughCoat PS.

The following information about this coating has been provided by Prosoco, and NPCA member company.

> "PROSOCO's Concrete Science ToughCoat PS is a polysilicate based concrete densifier designed for use in a very narrow application with a limited range of performance characteristics. The product works by binding with the concrete substrate and filling surface pore space. When applied properly, treated concrete will have additional resistance to some chemicals and limited water repellency. In typical applications, it is applied in excess and then buffed to achieve a glossy finish.
>
> ToughCoat PS is designed for use on interior, slick-troweled concrete, such as a warehouse floor. The product may cause significant appearance change on a broom finished or rough surface concrete. It is not designed for use on vertical concrete of any description, nor will it work on any other masonry substrate.
>
> As listed on the Product Data sheet, ToughCoatPS does impart some water repellency to a properly treated concrete. The published absorption rate reduction per ASTM C462 is 75% of control. This represents a marginal increase over the natural porosity and permeability of a dense concrete. As a matter of perspective, the minimum acceptable industry standard for water absorption rate reduction in a treated concrete is 80% of control. Architects typically

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specify a reduction of 90% or higher which is typically achieved by a variety of penetrating resin technologies.

2-19 cont.

Again, this is a product designed for a very specific and limited application. It does one job well, but is by no means a performance coating. PROSOCO was surprised to find this product listed on Appendix A to SCAQMD's proposed Rule 1113 changes. It is apparently being used as an example of a product that meets or exceeds the targeted low VOC standard for the Waterproofing Concrete/Masonry Sealers category. While it is compliant, its performance characteristics render it unsuitable for the majority of horizontal and vertical concrete surfaces encountered in the built environment. It is inconceivable to PROSOCO that this one product and a handful of other penetrating and film forming products on the market could be used to justify regulation of all specialty products used on the one hundred or so identified common substrates and finishes."

(See Appendix below for additional comments made by PROSOCO.)

Other manufacturers have made similar comments about the coatings relied upon by SCAQMD to justify the proposed limits both in writing and in oral statements at the SCAQMD meetings.

2-20

Concluding Comment: We appreciate the opportunity to comment on the DEA and we ask that our comments be given serious consideration. The DEA's justification for requiring a VOC reduction of nearly 70% from the coatings at issue is insufficient, in major part because the underlying information and record it relies upon ignores or assumes away crucial information which demonstrates the serious performance issues with coatings at the proposed limits. Essential performance tests have not been performed and reliance is placed on a limited number of coatings in the market or under development as being suitable to meet the all of the performance and application requirements of the entire coatings categories. We believe that the rulemaking should be delayed in order to allow industry to more fully address these deficiencies in the record of a proposal that was first presented in mid-August.

Sincerely,

Jim Sell
Senior Counsel

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Appendix

From: Dwayne Fuhlhage [mailto:dfuhlhage@prosoco.com]
Sent: Wednesday, October 08, 2003 2:09 PM
To: Bob Nelson
Cc: Jason Netherton; David Cummins; Fran Gale
Subject: PROSOCO Substrate List 10-2003.xls

Bob, we are working on putting some comments together for you. We'll do what we can in the time allotted.

I received the AVES report this morning and am going over it. Just how much of their future strategy are they hanging on this? I am up to 5-1 and have found very little reference to use on concrete and masonry substrates. The one test they mention in passing is for concrete and it does not state how the product has been applied. From our perspective, the following crucial information has been omitted in their testing:

For exterior concrete:

Concrete finish (smooth, brushed, exposed aggregate)
Application method and coverage rate
Was this on green concrete (<28 days old) or old concrete (pH stability makes a big difference on green concrete due to alkalinity; many water carried emulsions are unstable or will not react with alkaline concrete)
How is the UV stability over time (normally use weather chamber per ASTM-G154?
What is the slip resistance of the product on exterior, horizontal substrates per ASTM-C1028?
What are the chloride screening capabilities per:
NCHRP 244 Series IV
AASHTO T259/260
(refer to our Product Data for Saltguard WB on our website)

2-21

These are off the top of my head. Additional study by our technical people may turn up a few more issues.

From a more general perspective, it is hard to conceive how they can derive a 50 or 100 g/L standard for ALL masonry substrates based on the Waterproofing Sealer WPS-2. A film forming material is not appropriate in many cases. Very few film formers will work for road maintenance departments that have to deal with chloride issues from de-icers or proximity to the ocean. I don't see any real methodology for how they tested the product. Interior or exterior? Horizontal or vertical?

After all of our R&D on low VOC products, it is hard for us to believe that anyone has truly come up with zero VOC products as listed in the AVES report. I think it would be fair to see the same calculation sheets that industry has to turn in to CARB, especially since their limited testing leads them to regulating an entire industry.

One thing that strikes me about the proposed rule and the AVES report is that there is no recognition of just how many masonry substrates there are. Hence the attachment of the types of substrates our products are applied on. I also note that Appendix A has no listing of substrate limitations (interior/exterior, wet surfaces, UV stability, pH stability, chloride screening, type of masonry substrate) or final appearance. You don't put a film forming varnish on a sandstone. Some stain resistant concrete densifiers (like our Tough Coat PS in Appendix A) impart no water repellency and vice versa. None of the penetrants or standard varnishes do anything in the way of providing water repellency to concrete block, which is a current favored building material. For that you need a long molecule such as RTV which cannot be carried in water. Most of the penetrants that work on concrete are incompatible with natural stone with low silica content- that uses a different resin technology which currently is incompatible with water. Consolidation treatments for natural stone are an entirely different beast, but is still lumped in with their generic classification.

The list goes on and on.

2-21 cont.

We won't have it done for you this week, but we are intending to create a cross-reference spreadsheet that shows all of the various substrates and the coating technologies that are appropriate for each one. We'll include limitations for each technology. We'll need to work with you on what kind of formal comments will best help NPCA in future litigation.

One thing that might help you get a handle on the variety of substrates and technologies is by looking at the project reference database on our website. It includes the actual laboratory reports we have created when material comes through our lab for testing. It is broken down by substrate families and then specific substrates.

One last comment with regards to VOC calculation methods. The proposed rule lists USEPA Method 24 and SCAQMD's Method 304. We have run across CARB Method 310 in our Green Seal product development and are wondering if it would help us at all with product having a high water content. Would requesting that 310 be included as an alternate test method be good for industry? We are going to run the numbers with one of our 15% active penetrants to find out.

That is it for now. We'll pass on more as we come up with it.

Dwayne

COMMENT LETTER #2 FROM
THE NATIONAL PAINT AND COATINGS ASSOCIATION (NPCA)

(OCTOBER 24, 2003)

Response to Comment 2-1

The SCAQMD disagrees with the commentator's opinion that the analysis in the Draft Environmental Assessment is "fatally flawed." The Environmental Assessment analyzes the adverse impacts As required by CEQA Guidelines 15070(a). According to the CEQA Guidelines §15021(b), "in deciding whether changes in a project are feasible, an agency may consider specific economic, environmental, legal, social and technological factors." However, CEQA Guidelines also states "Economic and social changes resulting from a project shall not be treated as significant effects on the environment" (CEQA Guidelines §15064(e)). Lowering the VOC content limits in coating formulations will not physically change the architectural coating procedure or structures being painted. Furthermore, the proposed amendments to Rule 1113 are considered to be technologically feasible because compliant coatings in the categories where the VOC content limit will be reduced, are currently available as indicated in Appendix B of the Environmental Assessment. Specific responses to the commentator's opinions on the quality of the environmental analysis are provided in the following responses to comments.

Response to Comment 2-2

The SCAQMD staff has provided adequate time and information for other public agencies and members of the public to review and comment on the Draft EA. Staff has kept industry involved in the rule development process, provided the scope of the proposal to industry, including amendments to specific coating categories, at earlier working group meetings held on March 20, 2003, May 6, 2003, and July 16, 2003, and to the public and other public agencies prior to August 2003. Staff also provided substantial time for industry to provide input at each step in the amendment process, including the requirements of the proposal prior to issuing the August 2003 version of the rule. SCAQMD staff disagrees with the commentator's rulemaking characterization of late and last minute exchange of information etc. Reasons for changes to the project description and the rule stem from resolving issues raised by the public and industry representatives. In the meantime, the SCAQMD has complied with the legal requirements and continues to work with interested parties in the rule development process. The 30-day review and comment time period is consistent with the CEQA Guidelines §15105(b), which states that the public review period for a CEQA document with no significant adverse environmental impacts "shall not be less than 20 days." Based on input from the public, however, the rulemaking period was extended by an additional 30 days period to provide more time to industry for an exchange of information. This extension was granted so that staff could obtain additional information from the commentator. However, staff has repeatedly requested studies from the commentator and its member companies that provide empirical data to validate comments provided by the industry. To date, the SCAQMD has not received any such information from the commentator.

Response to Comment 2-3

While the Draft EA references the AVES study as a study of side-by-side comparison testing of the coatings affected by the proposed amendments, it is not the only evidence to support the conclusions in the Draft EA nor meant to be all-inclusive, but rather a relative performance comparison of solvent-borne and waterborne coatings. Case studies by USEPA and Midwest Research Institute, as well as performance data and product data sheets from coating manufacturers compiled under Appendix B of the EA provide further evidence of the availability and use of these compliant coatings. Furthermore, Chapter II, Table 1 of the staff report summarizes market penetration data for sales of these products in the Year 2000 for each of the categories included in the current proposal. In the three years subsequent to the year 2000 data, staff anticipates that the market penetration data probably greater for each of the categories, based on the findings of the Annual Status Reports, as well as the presence of compliant products listed in Appendix B and not included in the CARB survey.

Response to Comment 2-4

The AVES Study was designed to assess the most common performance characteristics, based on the type of testing conducted and reported for the coating categories on their technical data sheets. While Taber Abrasion is commonly conducted by manufacturers of clear wood coatings used on floors, it is not the only test. A review of some of the performance information obtained from the coating manufacturer, Bona Kemi, clearly indicates the use of Taber Abrasion as a key test. Specifically, their technical data sheet indicates that "The Taber test, the most commonly accepted standard lab test for durability, evaluates the resistance of a material to abrasion. For hardwood floors, this equates to evaluating wear." Additionally, information provided by Bona-Kemi indicates that their clear waterborne wood floor coating with a VOC of 240 g/l, as tested by SGS U.S. Testing Co, indicated twice the durability than the nearest competitor, which included oil-modified finishes, as tested under the Taber Abraser Grit Feeder Test. Staff agrees that actual traffic tests should also be examined to assess actual performance characteristics of polymers. Staff did so by reviewing data collected by Bona-Kemi on testing that began in 1993 by the Wood Sciences Department at the Colorado State University. Test panels of hardwood flooring with wear-through lines were coated with finishes according to manufacturers' specifications and placed in busy university hallways. As a part of the study, all panels are rotated periodically to ensure even wear patterns. Year-around traffic from faculty and students with hiking boots, rollerblades, skateboards, bicycles and pets tracking in water, snow, salt and dirt, provides a true 'real-life' durability test. These test panels are rated in terms of wear-through, scuff, scratch, and chemical resistance, as well as overall visual appearance. These real-life tests have confirmed the laboratory testing using the Taber Abrasion testing, and have concluded that the waterborne formulation by Bona-Kemi are the most durable available, as compared to other solventborne and waterborne finishes. These products by Bona-Kemi have been used on numerous residential and commercial uses, including large areas. One such location is the Barneys of New York store in Beverly Hills where more than 5,000 square feet of maple wood coating was applied.

Response to Comment 2-5

Coefficient of friction test (which determines probability of slips and falls on coatings) was not specifically a part of the AVES Study, but is a performance characteristic evaluated by the SCAQMD staff. Bona-Kemi's Traffic™ product is classified by Underwriters Laboraties, Inc., as a slip resistant coating. There are already existing compliant coatings in each of the categories affected by the rule amendment. Thus, these formulations, which have already been tested, may be used safely.

Response to Comment 2-6

As indicated in Response to Comment 2-4, Bona-Kemi's products have been successfully applied over large areas without any panelization issues in residential and commercial environments. Staff also disagrees with the commentator's assertion that lower-VOC finishes have longer dry times. The AVES Study, as well as performance data from Bona-Kemi clearly indicates that the waterborne products actually dry and cure faster than their solvent-borne counterparts. In conclusion, there are products in the marketplace that do not have the specific issues cited by the commentator.

Response to Comment 2-7

Safety and odor issues prevent certain solvent usage for all coating formulations, not just architectural coatings. If there are toxic ramifications from any compounds, whether formulated in a waterborne coating or a solvent-borne coating, the manufacturer has to consider the ability to use a coating as well as the safety issues to the consumer and contractor. The Bona-Kemi products discussed in earlier comments, as well as other products listed in Appendix B, do not have the specific issues listed by the commentator, and are regularly used by the professional applicator and the consumer. Typically, solvent-borne products, especially clear wood finishes, have more toxic solvents (e.g., toluene, ethyl benzene, etc.) than solvents found in waterborne formulations, as shown in chapter 2 of the EA.

Response to Comment 2-8

As indicated earlier, the AVES Study was designed to assess the most common performance characteristics, based on the type of testing conducted and reported for the coating categories on their technical data sheets. Also as indicated earlier, staff did not rely solely on the results of the AVES Study, but also relied on data obtained from manufacturers and other sources. The AVES Study was performed by a third-party contractor with expertise in coating development and evaluation, selected as a result of a Request for Proposal. The expertise of the contractor did not require an additional peer review.

Response to Comment 2-9

Please refer to Response to Comments 2-4 through 2-8. While staff recognizes the numerous uses of clear wood coatings, Appendix B lists a variety of clear wood coatings that can be used for each of the listed uses. As indicated earlier, the AVES study evaluated typical coatings performance characteristics and should not be considered "all inclusive" since each manufactures different characteristics for the same coating type.

Response to Comment 2-10

The SCAQMD staff disagrees that exterior products using an acrylic or epoxy resin cannot have UV-resistance. In the AVES Study, there is a detailed assessment of the modified epoxy resin that shows the best UV resistance. Furthermore, Appendix B includes numerous products that can be used to replace the traditional spar varnishes, including urethane products by JFB Hart and Epmar. The SCAQMD has used these zero-VOC polyurethane coatings on exterior substrates for the past five years. These wood substrates have indicated excellent gloss retention and film appearance.

Response to Comment 2-11

Although the interior stains included in the AVES Study performed well in the laboratory environment, as well as the case study, the current proposal does not lower VOC limits for interior stains.

Response to Comment 2-12

The SCAQMD staff disagrees with the commentator's opinion expressed in this comment. The AVES Study did include a thorough assessment of exterior semi-transparent and opaque stains, concluding that the zero-VOC products performed better for UV resistance, as tested under ASTM G53-88 on both redwood and cedar. Nevertheless, the staff recognizes the industry desire to conduct additional real time exposure studies for exterior stains, and has therefore modified its initial proposal and proposed a 42 month implementation period to allow for the completion of the reformulation and exterior field testing. Furthermore, the semi-transparent urethane-based coatings available today are excellent substitutes for both horizontal and vertical surfaces and can be used as exterior semi-transparent stains and have been used on new and previously painted substrates, including wood decks. JFB Hart products have been used on an exterior wood deck in Chicago that was previously coated with a solvent based semi-transparent stain over two years ago without showing any wear.

Response to Comment 2-13

Please refer to Response to Comment 2-12. As indicated in earlier responses, the AVES study is not "all inclusive" and the SCAQMD has relied on assessment of commercially available products and their actual performance in the field. Appendix B and the staff report lists several exterior deck stains. Okon Company manufactures and sells a product called DECK STAIN, which is a water-based water repellent and wood stain for horizontal wood applications. This product is designed for decks constructed with milled, pressure-treated, and rough lumber. ASTM testing results show that this product performs equally or better than its higher-VOC counterparts. For example, this product passes the QUV 1,000 hour test for ultraviolet light resistance, as well as ASTM D3359-90 for vapor transmission. The VOC content is approximately 100 g/l. Columbia Paint & Coatings manufactures and sells the Woodtech Solid

Color Pre-Stain (09-870), a low VOC (62 g/l) interior and exterior stain for bare wood substrates. The technical information from the manufacturer indicates "excellent color retention, good penetration, and recoat properties." The company representative indicated that this product forms a hard film that is abrasion resistant. Epmar Corporation also manufacturers and sells a variety of low-VOC stains, including pigmented, clear, and semi-transparent. The Kemiko Transparent Stain is a single component product recommended for use on concrete, plaster, polymer cement, and wood. Applications include walkways, decks, hospitals, schools, shopping malls, restaurants, and theme parks. The VOC content is less than 30 g/l. Furthermore, detailed evaluations were conducted by Consumer Reports Magazine (June 2002 and August 2003), on clear, semi-transparent, toned, and opaque stains used on horizontal surfaces such as decks. The conclusion from the August 2003 article indicates that opaque stains, mainly due to the higher pigment content, last the longest, typically more than three years, whereas "a semi-transparent finish may need to be reapplied every two to three years. The conclusion also indicates that clear deck finishes don't last more than one year (for both high VOC finishes as well as low-VOC finishes)." Nonetheless, based on the comment, staff has revised the final compliance date for stains to July 1, 2007, thus, providing more time for additional development and testing. Additionally, this category is included in the future technology assessment, where specific characteristics could be assessed.

Response to Comment 2-14

The AVES Study analyzed the typical characteristics for waterproofing sealers for wood. Appendix B, as well as the staff report, lists numerous waterproofing sealers, indicating their performance characteristics well beyond beading of water. These products indicate good performance on water sealing. It should be noted that the largest manufacturer of waterproofing sealers for wood uses beading of water as a marketing tool.

Response to Comment 2-15

Although the AVES Study did not specifically analyze typical Department of Transportation (DOT) or National Cooperative Highway Research Program (NHCRP) tests, staff evaluated numerous products that comply with the proposed VOC content limits for this coating category and that meet the DOT requirements and the NHCRP requirements. These are discussed in detail in the staff report, as well as included in Appendix B. Therefore, there are available compliant products that meet the DOT requirements, such as L&M's Aquapel Plus waterproofing concrete/masonry sealer, Rainguard's Blok-Lok clear water repellant, and Poly-Carb Mark-163 Flexogrid (2-component).

Response to Comment 2-16

The AVES Study did show the sandability of the zero-VOC sanding sealer to be okay. However, the KCMA data and USEPA Case Studies Reports, as well as SCAQMD's Technology Assessment Report for Rule 1136 – Wood Coatings, all indicated the successful use of waterborne sanding sealers, with a VOC content of 250 g/l to 275 g/l. Therefore, the proposed limit is established at 275 g/l.

Response to Comment 2-17

Because of the chemical solvency of solvent-based coatings to dissolve dirt and other contamination, they are more "forgiving" in application than waterborne coatings. Staff recognized this problem by avoiding any VOC content reductions on bituminous roof primers. With the application of solvent-based primer to bituminous roofing materials, any surface can be prepared to accept basecoats and subsequent topcoats. Metallic roof coatings with VOC contents of 500 grams per liter are excessively high, particularly in light of the availability of waterborne aluminum roof coatings that can be formulated with VOC contents at or below 100 grams per liter. Upon further consideration to address concerns that aluminum coatings need more solvent, staff is recommending a separate category for aluminum roof coatings and setting a lower limit consistent with the lowest VOC containing waterborne aluminum roof coating emulsions, consistent with Title 24 for roof additions, alterations, and repairs (0.30 reflectivity) and opening the possibility of new aluminum roof coatings to achieve the high standards for new construction of the California energy code. A definition of aluminum roof coatings has been added as well, setting the elemental aluminum content to 0.7 pound of elemental aluminum per gallon of coating. The SCAQMD is aware that during storage waterborne aluminum coatings may be prone to chemical reactions that produce hydrogen and aluminum oxide stoichiometricly and the rate of reaction is accelerated by the addition of heat. Excessive pressure buildup and oxidation of the aluminum flake have been minimized through proprietary additives that slow this reaction. United Coatings, manufacturers of waterborne aluminum coatings, indicate that several drums of aluminum coating have been in storage for three years without excessive pressure buildup issues. If little hydrogen has been produced in three years with the chemical additive, it is necessarily true that little oxidation has also occurred. Most waterborne aluminum roof coatings are purchased in bulk and professionally applied within a short period of time, so that chemical reactions are not a concern. In the case of consumer use and storage of waterborne aluminum roof coatings, a pressure relief valve is installed on the containers sold to consumers, which ensures that pressure build-up will not occur. White reflective coatings are typically marketed to consumers. Lastly, Rule 1113 contains a specialty coating category called Bituminous Roof Primers that have a VOC limit of 350 g/l. At this time, staff is not proposing a lower limit for these bituminous roof primers

Response to Comment 2-18

The SCAQMD staff disagrees with the opinion of the commentator that the Draft EA reflected only the comments supporting the limits. As noted in Response to Comment 2-2, the SCAQMD provided substantial opportunities to provide comments through working group meeting, public consultation meetings, etc. The SCAQMD also extended the period for providing comments on the staff proposal by 30 days. Also as noted in Response to Comment 2-2, when asked to provide empirical data to support comments made by the regulated industry, such data or other information was not provided.

Response to Comment 2-19

Staff recognizes that there are a variety of waterproofing sealers and waterproofing concrete/masonry sealers, and that formulations cover specific different uses. Appendix A of the Staff Report and Appendix B of the EA list a large number of compliant products that represent a variety of uses, including concrete driveways, pool decks, vertical concrete block walls, concrete tilt up walls, and exposed aggregate. The list also includes products recommended for above-grade and below-grade, as well as interior and exterior uses. There are also several penetrating sealers that meet the DOT requirements, as tested under the NCHRP 244 tests (see Response to Comment 2-15). The AVES study includes a side-by-side comparison of acrylic, alkyd, and epoxy-based sealers that clearly shows the superior performance of the zero-VOC epoxy-based waterproofing concrete/masonry sealer compared to the alkyd- and acrylic-based sealers. Lastly, the availability and use of these products clearly demonstrate that these products perform well, especially since they are being used in the absence of any regulatory requirements with such low VOC limits.

Response to Comment 2-20

Comprehensive responses have been prepared for all comments received on the Draft EA. The commentator, however, should be aware that the role of the EA is to analyze potential adverse environmental impacts from the proposed project, which includes reducing the VOC content limits for specific coating categories. Data and other technical information that support staff's proposal to reduce the VOC content of selected coating categories can be found primarily in the Staff Report for the proposed project. Information on the availability of coatings that currently comply with the proposed VOC content limits can also be found in Appendix B of the EA. With regard to specific issues raised by the commentator, please refer to the responses to comments above.

Response to Comment 2-21

Staff recognizes that there are a variety of waterproofing sealers and waterproofing concrete/masonry sealers, and that formulations cover specific different uses. Appendix A of the Staff Report and Appendix B of the EA list a large number of compliant products that represent a variety of uses, including concrete driveways, pool decks, vertical concrete block walls, concrete tilt up walls, and exposed aggregate. The list also includes products recommended for above-grade and below-grade, as well as interior and exterior uses. There are several penetrating sealers that meet the DOT requirements, as tested under the NCHRP 244 tests. The AVES study includes a side-by-side comparison of acrylic, alkyd, and epoxy-based sealers that clearly shows the superior performance of the zero-VOC epoxy-based waterproofing concrete/masonry sealer compared to the alkyd- and acrylic-based sealers. The availability and use of these products clearly demonstrate that these products perform well, especially since they are being used in the absence of any regulatory requirements with such low VOC limits.

One example of a compliant waterproofing concrete/masonry sealer included in Appendix A of the Staff Report and Appendix B of the EA is Flexogrid™ (MARK-163), manufactured by POLY-CARB, is a zero-VOC urethane-epoxy copolymer recommended for use on bridge decks, parking decks, highway on and off-ramps, and weather-exposed concrete structures requiring waterproofing and skid-resistant qualities. It also has flexibility to accommodate minor movements of the substrate such as vibrations, thermal shock, freeze and thaw cycles, expansion or contraction due to weather. This is a film-forming coating that protects the concrete from water absorption and chloride ion permeation. This product is formulated to provide good abrasion resistance, tensile elongation, and skid number. Listed below are results from tests performed by independent laboratory:

Tensile Strength	ASTM D638-82	>2,500 psi
Tensile Elongation	ASTM D638-82	35 ± 5
Shore D Hardness	ASTM D2240-75	65 ± 5
Abrasion Resistance - Wear Index	ASTM C-501	75-85 mg
Water Absorption Max.	ASTM C-570	0.2%
Chloride Ion Permeability	AASHTO T277	200 coulombs avg.
Skid number	ASTM E 524	40-45 avg.

As of 1999, Flexogrid has been used by Department of Transportations in Ohio, N. Carolina, Alabama and Illinois State among others, in over 110 transportation projects in both the United States and Canada.

COMMENT LETTER #3

CURTIS COLEMAN, ESQUIRE

Comments of The Sherwin-Williams Company
on the
Draft Environmental Assessment for PAR 1113

3-1 The Sherwin-Williams Company has reviewed the DEA for PAR 1113 and believes that the discussion of the "more frequent recoating" issue is inadequate as it pertains to exterior stains. Sherwin-Williams has advised the SCAQMD staff on numerous occasions during the development of these rule amendments that a 100 gram per liter limit for semi-transparent exterior stains will not allow the production of semi-transparent stains suitable for use on horizontal surfaces subject to wear and abrasion, such as concrete driveways and patios, and wooden decks. Semi-transparent stains for these uses must be formulated with harder resins that can withstand the wear that vertical surfaces (e.g., siding) are not exposed to. These harder resins require more coalescing solvent than the softer resins. The additional coalescing solvents in an otherwise waterborne formulation require a regulatory VOC limit of 250 grams per liter.

The product listings prepared by SCAQMD staff support this conclusion. Virtually all of the stains recommended for horizontal surfaces such as decks have VOC contents over 200 grams per liter. In our experience, semi-transparent stains with VOC content at or less than 100 grams per liter lack the durability for use on horizontal surfaces, or require a topcoat to provide that durability. If a semi-transparent stain lacking durability is used, additional VOCs will be generated by the need for more frequent recoating, thus negating the anticipated benefits of the rule. Likewise, if an additional topcoat is required to provide the durable finish, more VOCs will be emitted than would be the case if a durable stain were used in the first instance.

3-2 Sherwin-Williams was not the only manufacturer to raise this issue during the rule development process, thus we were surprised to see that no discussion of this issue was incorporated into the DEA.

Curtis L. Coleman
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COMMENT LETTER #3 FROM CURTIS COLEMAN, ESQUIRE

(OCTOBER 24, 2003)

Response to Comment 3-1

Appendix A and the Staff Report and Appendix B of the EA list several compliant exterior deck stains. Okon Company manufactures and sells a product called DECK STAIN, which is a water-based water repellent and wood stain for horizontal wood applications. This product is designed for decks constructed with milled, pressure-treated, and rough lumber. ASTM testing results show that this product performs equally or better than its higher-VOC counterparts. For example, this product passes the QUV 1,000 hour test for ultraviolet light resistance, as well as ASTM D3359-90 for vapor transmission and is considered to be as durable as some of the higher VOC exterior stains. VOC is approximately 100 g/l. Columbia Paint & Coatings manufactures and sells the Woodtech Solid Color Pre-Stain (09-870), a low VOC (62 g/l) interior and exterior bare wood substrates. The technical information from the manufacturer indicates "excellent color retention, good penetration, and recoat properties." The company representative indicated that this product forms a hard film that is abrasion resistant. Epmar Corporation also manufacturers and sells a variety of low-VOC stains, including pigmented, clear, and semi-transparent. The Kemiko Transparent Stain is a single component product recommended for use on concrete, plaster, polymer cement, and wood. Applications include walkways, decks, hospitals, schools, shopping malls, restaurants, and theme parks. The VOC content is less than 30 g/l. Furthermore, detailed evaluations were conducted by Consumer Reports Magazine (June 2002 and August 2003) on clear, semi-transparent, toned, and opaque stains are used on horizontal surfaces such as decks. The conclusion from the August 2003 article indicates that opaque stains, mainly due to the higher pigment content, last the longest, typically more than three years, whereas "a semi-transparent finish may need to be reapplied every two to three years. The conclusion also indicates that clear deck finishes don't last more than one year. However, these conclusions were true for higher VOC stains as well as low VOC stains. Nonetheless, based on the comment, staff has revised the final compliance date for stains to July 1, 2007, thus, providing more time for additional development and testing. Additionally, this category is included in the future technology assessment, where specific characteristics could be assessed.

Response to Comment 3-2

SCAQMD staff believes there were durable compliant exterior stains available at the time of the release of the Draft EA, thus a general durability discussion was included in the Draft EA. Rule 1113 requires a technology assessment to re-assess the performance characteristics, including durability. Stains are included in this assessment and if there are performance concerns with currently available compliant exterior stains for horizontal surfaces and there are limited possibilities of the development of a durable compliant exterior stain in the future, SCAQMD staff will consider a modification to the rule amendment to address this issue.

A T T A C H M E N T H

FINAL SOCIOECONOMIC REPORT

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Final Socioeconomic Report For
Proposed Amended Rule 1113─Architectural Coatings

December 2003

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EXECUTIVE SUMMARY

A socioeconomic analysis was conducted to assess the impacts of Proposed Amended Rule 1113 (PAR 1113)─Architectural Coatings. A summary of the assessment and findings are presented below.

Elements of the Proposed Amendments	PAR 1113 will lower the current VOC limit for the categories of roof coatings; clear wood finishes, including varnish and sanding sealers; and waterproofing sealers, including concrete and masonry sealers, and exterior stains. The proposed VOC limit will become effective on January 1, 2005 for roof coatings, ~~and~~July 1, 2006 for ~~the other coating categories, July 1, 2006~~clear wood finishes and waterproofing sealers, and July 1, 2007 for exterior stains. In addition, PAR 1113 would eliminate the exemption for clear wood finishes with containers of a quart or less effective on July 1, 2006. PAR 1113 is expected to result in reducing approximately 1,362 tons of VOC per year.
Affected Facilities	PAR 1113 would potentially impact industries engaged in manufacturing paint and end users of architectural coatings. The former belongs to the industry of chemical and allied products [SIC (Standard Industrial Classification) 2851 or NAICS (North America Industrial Classification Systems) 325510], and the latter are a part of the industry of painting and paper hanging (SIC 1721 or NAICS 235210). The proposed amendments will also affect do-it-yourself consumers and homeowners.
Assumptions of Analysis	Existing products are available to meet the VOC limits in the proposed amendments. To provide the worst-case analysis, this assessment assumes that architectural coating manufacturers may need to reformulate existing coatings, primarily by using currently-available, technologically-innovative resins, as well as exempt solvents. The high-end cost estimates assume 10 percent increase in the average cost for clear wood finishes, roof coatings, stains; and 20 percent increase for waterproofing sealers based on product survey results.
Compliance Costs	The total cost impact from lowering the VOC limits is estimated to be $14.76 million annually, when averaged over the 2005-2020 period. This cost represents 1.89 percent of the average projected sales of the paints and allied products (SIC 2851) sector for the period of 2005-2020.
Regional Economic Impacts	Based on the above assumptions, compliance costs and the application of the Regional Economic Models, Inc. (REMI) model, it is estimated that an average of 503 jobs could be forgone annually in the four-county area from the future projected growth between 2005 to 2020. The average annual number of jobs forgone is about 0.0051 percent of the average

Regional Economic Impacts	number of jobs in the four-county area for the period of 2005-2020. The proposed amendments could result in an increase in the product price of construction sector (SIC 15-17), a local industry which includes painting contractors, by 0.021 percent and 0.020 percent in 2010 and 2020, respectively.

PROPOSED AMENDED RULE 1113

The proposed amendments to Rule 1113 (PAR 1113) will lower the current VOC limit for the categories of roof coatings; clear wood finishes, including varnish and sanding sealers; and waterproofing sealers, including concrete and masonry sealers, and exterior stains. The proposed VOC limit will become effective on January 1, 2005 for roof coatings, ~~and~~July 1, 2006 for ~~the other coating categories, July 1, 2006~~clear wood finishes and waterproofing sealers, and July 1, 2007 for exterior stains. In addition, PAR 1113 would eliminate the exemption for clear wood finishes with containers of a quart or less effective on July 1, 2006.

LEGISLATIVE MANDATES

The socioeconomic assessments at the South Coast Air Quality Management District (SCAQMD) have evolved over time to reflect the benefits and costs of regulations. The legal mandates directly related to the assessment of the proposed rules and amendments include the SCAQMD Governing Board resolutions and various sections of the California Health & Safety Code (H&SC).

AQMD Governing Board Resolutions

On March 17, 1989 the SCAQMD Governing Board adopted a resolution that calls for preparing an economic analysis of each proposed rule or amendment for the following elements:

- Affected Industries
- Range of Control Costs
- Cost Effectiveness
- Public Health Benefits

On October 14, 1994, the Board passed a resolution which directed staff to address whether the rules or amendments brought to the Board for adoption are in the order of cost effectiveness as defined in the AQMP. The intent was to bring forth those rules that are cost-effective first.

Health & Safety Code Requirements

The state legislature adopted legislation that reinforces and expands the Governing Board resolutions for socioeconomic assessments. H&SC Sections 40440.8(a) and (b), which became effective on January 1, 1991, require that a socioeconomic analysis be prepared for any proposed rule or rule amendment that *"will significantly affect air quality or emissions limitations."* Specifically, the scope of the analysis should include:

- Type of Affected Industries
- Impact on Employment and the Economy of the Basin
- Range of Probable Costs, Including Those to Industries
- Emission Reduction Potential

- Necessity of Adopting, Amending or Repealing the Rule in Order to Attain State and Federal Ambient Air Quality Standards
- Availability and Cost Effectiveness of Alternatives to the Rule

Additionally, the SCAQMD is required to actively consider the socioeconomic impacts of regulations and make a good faith effort to minimize adverse socioeconomic impacts. H&SC Section 40728.5, which became effective on January 1, 1992, requires the SCAQMD to:

- Examine Small Business Impacts
- Consider Socioeconomic Impacts in Rule Adoption

Finally, H&SC 40440.5 require that social, economic, and public health analyses of proposed rule or amendment be available to the public by no fewer than 30 days prior to the hearing.

Issues other than economic issues are addressed in the staff report. Additionally, the staff report examines the cost-effectiveness of alternatives to the rule, i.e., add-on controls.

AFFECTED FACILITIES

The proposed amendments to Rule 1113 would potentially impact manufacturers and end users of architectural coatings. The former belong to the industry of chemical and allied products [SIC (Standard Industrial Classification) 2851 or NAICS (North America Industrial Classification Systems) 325510], and the latter are a part of the industry of painting and paper hanging (SIC 1721 or NAICS 235210). According to the County Business Patterns, there are approximately 1,713 painting contractors and 115 establishments in the paints and allied products industry in the district. The proposed amendments will also apply to do-it-yourself consumers and homeowners. However, the number of affected facilities cannot be determined because the majority of them are not permitted.

Small Business Impacts

Small businesses are a subset of all businesses potentially affected by the proposed amendments. The number of small businesses affected varies according to the specific definition of "small business" used. There are several definitions of "small business" commonly used. Each of these definitions is described below.

The SCAQMD defines a "small business" in Rule 102 as one which employs 10 or fewer persons and which earns less than $500,000 in gross annual receipts. In addition to the AQMD's definition of a small business, the federal Small Business Administration (SBA), the federal Clean Air Act Amendments (CAAA) of 1990, and the California Department of Health Services (DHS) also provide their own definitions of a small business.

The SBA's definition of a small business uses the criterion of either gross annual receipts (ranging from $0.5 million to $17 million, depending on industry type) or number of employees (ranging from 100 to 1,500). The SBA definitions of small businesses vary by 4-digit SIC code. The industries affected by PAR 1113 mainly belong to SIC 2851— chemical and allied products and SIC 1721—painting and paper hanging contractors. For the industry of chemical and allied products (of which architectural coatings manufactures represent about 40 percent), the SBA defines a "small business" as one having 500 employees or fewer. A business in the painting and paper hanging sector with less than $11.5 million in gross annual receipts is considered small by SBA.

The CAAA classifies a facility as a "small business stationary source" if it: (1) employs 100 or fewer employees, (2) does not emit more than ten tons per year of either VOC or NOx, and (3) is a small business as defined by SBA. The DHS definition of a small business uses an annual gross receipt criterion (ranging from $1 million to $9.5 million, depending on industry type) for non-manufacturing industries and an employment criterion of fewer than 250 employees for manufacturing industries.

Under the SBA's, CAAA's, and CAA's definitions of small business, most of the affected paint companies and businesses in the painting and paper hanging sector could potentially be small businesses. In addition, most of the businesses in the painting and paper hanging sector are run by mom and pop shops. Compared to other definitions, the number of affected small businesses will be smaller under the SCAQMD's definition. Since the number of affected businesses cannot be determined due to the lack of permits, the number of affected small businesses cannot be known.

COMPLIANCE COST

Existing products are available to meet the VOC limits in the proposed amendments. To provide a worse-case analysis, the assessment herein assumes that architectural coating manufacturers may need to work with formulators to reformulate existing coatings, primarily by using currently available, technologically innovative resins as well as exempt solvents. For the purpose of this analysis, the resin suppliers and paint manufacturers are both considered as one sector, i.e., paint and allied products (SIC 2851 or NAICS 325510).

Based on the data obtained from coating manufacturers, staff has developed three cost scenarios to estimate the additional compliance costs (reformulation cost) of PAR 1113. The market penetration scenario is based on price differences between compliant and non-compliant coatings at current market prices. The low-end cost scenario represents an additional 10 percent increase in the average cost per gallon of affected coating categories compared to non-compliant coatings and the high-end cost scenario assumes 10 percent increase in the average cost for clear wood finishes, roof coatings, exterior stains; and 20 percent increase for waterproofing sealers. These price increases are based on product survey results and reflect not only increased raw material costs but also other manufacturing costs to be recouped by coating manufacturers, such as research and development, testing, marketing, labeling, and so on. The overall cost-effectiveness of the proposed amendments (total costs/total emissions reductions) is expected to range between \$4,229 and \$11,405 per ton for 1,362 tons of VOC reduced annually. For the purpose of analyzing the worst-case scenario, the socioeconomic assessment is based on the high-end cost scenario.

Table 1 shows the non-compliant and compliant product prices per gallon and current and projected annual usage for the affected coating categories. The projected number of gallons includes differences in the percentage of solids by volume between compliant coatings and non-compliant coatings. This adjustment does not take into account potential increased usage from population growth. The Rule Staff Report contains a more detailed cost analysis. Based on the data from the 2001 CARB survey, the portions of affected coatings that already comply with the proposed VOC limits (market penetration) are 36 percent for clear wood finishes, 51 percent for roof coatings, 11 percent for exterior stains, and 20 percent for waterproofing sealers. Only the non-compliant portion of the affected categories is included in the analysis herein.

Table 2 shows the annual and the average annual costs of the proposed amendments by category for the years 2005, 2006, 2007-2020, and 2005-2020. The annual costs are derived by multiplying the increased cost per gallon by the difference in the number of projected and current gallons sold. The average annual cost of the proposed amendments is estimated at \$14.76 million.

Table 1
Cost per Gallon and
Number of Gallons by Category

Coating Categories	Cost/Gallon (in Dollars)		Current Number of Gallons per year	Projected Number of Gallon per year
	Non-compliant	Compliant		
Clear Wood Finishes	$30.67	$33.74	430,683	643,476
Roof Coatings	$20.21	$22.23	937,078	928,522*
Exterior Stains	$21.94	$24.14	1,098,176	912,456*
Waterproofing Sealers	$23.67	$28.41	373,339	571,728
Total			**2,839,276**	**3,056,182**

*Projected number of gallons is lower due to the difference in percentage of solids by volume.

Table 2
Incremental Cost by Category
(in Millions 2003 Dollars)

Coating Categories	Annual Cost 2005	Annual Cost 2006	Annual Cost 2007-2020	Average Annual (2005-2020)
Clear Wood Finishes	0	$8.50	$8.50	$7.97
Roof Coatings	$1.70	$1.70	$1.70	$1.70
Exterior Stains	0	0	-$2.07	-$1.81
Waterproofing Sealers	0	$7.40	$7.40	$6.90
Total	**$1.70**	**$17.60**	**$15.53**	**$14.76**

Based on recent data received from industry sources, it is assumed that painting contractors account for an estimated 65 percent of total paint sales and consumers account for an estimated 35 percent of total paint sales. Table 3 provides a summary of the estimated costs to these two sectors of the economy to which the cost of the proposed amendments is allocated.

Table 3
Estimated Annual Cost of Compliance (Millions of 2003 Dollars)

Industry	2005	2006	2007-2020	Average Annual (2005-2020)
Painting Contractors (SIC 1721)	$1.10	$11.44	$10.09	$9.59
Consumers	$0.60	$6.16	$5.44	$5.17
Total Cost	$1.70	$17.60	$15.53	$14.76

According to coating manufacturers and paint contractors, there may be additional costs beyond the cost presented above. Other costs for the paint contractors include training, learning, and testing the new reformulated coatings; frequent painting; possible construction defects; and litigation costs. For consumers, the additional cost could include the cost of repainting. No reliable data on such costs are available. The overall cost imposed on paint contractors will be largely passed on to consumers.

Several provisions in the proposed amendments attempt to minimize the cost impacts on affected businesses. The phased-in proposed amendments should ensure that the research and development cost of reformulation be spread over an extended period of time. Moreover, manufacturers of waterproofing concrete/masonry sealers that meet certain qualification requirements will be granted an extension of compliance date by two years.

REGIONAL ECONOMIC IMPACT

The potential job and other socioeconomic impacts of implementing PAR 1113 were projected through the use of the REMI model. The REMI model is an economic and demographic forecasting and simulation model designed to examine the economic and demographic effects resulting from policy initiatives or external events in a local economy. The REMI model used in this analysis contains historical economic data of the four-county area from 1969 throughout 1999. A 16-year analysis period (from 2005 to 2020) was used.

Compliance with PAR 1113 will start in the year 2005. The additional cost of compliance is distributed among the four counties based on the 2001 number of painting and paper hanging contractors in each county. Within each county, the contractors will face the additional cost of doing business. Less purchasing power of do-it-yourself paint users would be observed as the expenditure on paints takes a large share of their spending budget. On the other hand, the increased prices of reformulated architectural coatings (and other associated spending) translates to additional sales to paint manufacturers (SIC 2851). The additional sales were allocated to each county based on the output of the chemical and allied products industry in that county. The sales in each county is then further divided into the proportion that would stay locally and the proportion that would be satisfied by other regions, including the other three counties. Only the proportion of sales within the four-county boundaries is accounted for as the benefit to the four-county region.

Employment Impact by Industry

The total employment impact of PAR 1113 across industries in key years is shown in Table 4. It is estimated that an average of 503 jobs could be forgone annually from 2005 to 2020 in the local economy. This represents about 0.0051 percent of total estimated jobs in the four-county area, on average, between 2005 and 2020.

The sectors with the greatest jobs forgone from the proposed amendments are the construction (SICs 15-17) and the rest of retail (SICs 52-57, 59) sectors. The reduction in consumer purchasing power and demand for contractor-provided painting services due to increased paint costs would reduce consumer spending on other goods and services. As a result, there would be jobs forgone in the industries of eating and drinking (SIC 58), rest of retail (SICs 52-57, 59), wholesale (SICs 50-51), miscellaneous business services (SIC 73), medical (SIC 80), and miscellaneous professional services (SICs 81, 87, 89). The chemicals (SIC 28) sector is projected to add jobs due to additional sales made to this sector.

Table 4
Employment Impact of Proposed Amendments by Industry by Year

Industry (SIC)	2005	2007	2015	Average Annual 2005-2020
Lumber (24)	0	-2	-3	-3
Furniture (25)	0	-4	-4	-4
Stone, Clay, etc. (32)	0	-2	-3	-2
Primary Metals (33)	0	-1	-1	-1
Fabricated Metal (34)	0	-4	-5	-4
Non-electric Machinery (35)	0	-3	-3	-3
Elect. Equipment (36)	0	-3	-3	-3
Motor Veh. (371)	0	-1	-1	-1
Rest of Transp. Equip. (372-379)	0	-2	-2	-2
Instruments (38)	0	-3	-3	-3
Misc. Manuf. (39)	0	-1	-1	-1
Food (20)	0	-4	-4	-4
Tobacco Manuf. (21)	0	0	0	0
Textiles (22)	0	-1	-1	-1
Apparel (23)	0	-3	-2	-2
Paper (26)	0	-1	-2	-1
Printing (27)	0	-3	-4	-3
Chemicals (28)	2	18	13	14
Petroleum Products (29)	0	0	0	0
Rubber (30)	0	-1	-2	-2
Leather (31)	0	0	0	0
Mining (10,12-14)	0	-1	-1	-1
Construction (15-17)	-8	-73	-76	-71
Railroad (40)	0	0	0	0
Trucking (42)	0	-3	-3	-3
Local/Interurban (41)	0	-3	-3	-3
Air Transp. (45)	0	-3	-3	-3
Other Transp. (44,46-47)	0	-2	-2	-2
Communication (48)	-1	-6	-6	-5
Public Utilities (49)	0	-3	-3	-3
Banking (60)	-1	-11	-10	-9
Insurance (63,64)	-1	-8	-10	-9
Credit & Finance (61-62,67)	-1	-11	-9	-9
Real Estate (65)	-1	-11	-4	-6
Eating & Drinking (58)	-3	-28	-29	-27
Rest of Retail (52-57,59)	-8	-74	-75	-71
Wholesale (50-51)	-3	-26	-25	-24
Hotels (70)	0	-4	-8	-6
Personal Serv. & Repair (72,76)	-2	-17	-18	-17
Private Household (88)	-1	-6	-6	-6
Auto Repair/Serv. (75)	-1	-10	-11	-11
Misc. Busi. Serv. (73)	-4	-39	-48	-44
Amuse. & Recreation (79)	-2	-17	-16	-16
Motion Pictures (78)	0	-2	-2	-2
Medical (80)	-1	-7	-13	-11
Misc. Prof. Serv. (81,87,89)	-3	-31	-35	-32
Education (82)	-2	-20	-19	-18
Non-Profit Org. (83)	-2	-22	-23	-22
Agri/Forest/Fish Serv. (07-09)	0	-4	-5	-4
Government	-1	-20	-55	-42
TOTAL	**-48**	**-479**	**-548**	**-503**

Competitiveness of Industries

Some of the paint manufacturers located in the Basin have already reformulated and marketed coatings that comply with the proposed interim and final VOC limits. Some of the small local coatings manufacturers have a market niche in performance coatings that comply with the proposed interim and final VOC limits. This could put these small companies in a competitive advantage relative to the large, mass-market coatings producers.

Affected industries can either pass on the additional cost of doing business to consumers, or absorb this cost. In the REMI model, national industries whose main sales territory is in the nation are assumed to absorb the added cost of compliance. Such industries will face reduced profits. Conversely, industries whose main market area is local are more likely to pass the additional cost of doing business to consumers in terms of higher prices. The selling price of the construction sector (SIC 15-17), which includes painting contractors, is projected to increase by 0.021 percent and 0.020 percent in 2010 and 2020, respectively.

RULE ADOPTION RELATIVE TO THE COST-EFFECTIVENESS SCHEDULE

On October 14, 1994, the Governing Board adopted a resolution that requires staff to address whether rules being proposed for adoption are considered in the order of cost-effectiveness. The 2003 AQMP ranked, in the order of cost-effectiveness, all of the control measures for which costs were quantified. It is generally recommended that the most cost-effective measures be taken first.

Control Measure CTS-07 of the 2003 AQMP proposes to further reduce VOC emissions from various architectural coating categories and thinning and cleanup solvents used in the architectural and industrial maintenance coating industries. The cost-effectiveness of the entire control measure (CM#2003CTS-07) was estimated to be $20,000 per ton of VOC reduced. PAR 1113 implements the architectural coatings portion of the control measure only. The cost-effectiveness value for this portion of the control measure was not estimated in the 2003 AQMP. Consideration in order of cost-effectiveness is, therefore, not applicable.

However, PAR 1113 is recommended for adoption based on the schedule in the 1999 AQMP. That schedule reflected not only relative cost-effectiveness but other factors, including technological feasibility, total emission reduction potential, rate of reduction, public acceptability, and enforceability, as specified in H&SC 40922.

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A T T A C H M E N T I

FINAL ENVIRONMENTAL ASSESSMENT

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Final Environmental Assessment for:

Proposed Amended Rule 1113 - Architectural Coatings

SCAQMD No. 030925MK

November 18, 2003

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PREFACE

The Draft Environmental Assessment (EA) for the proposed amendments to Rule 1113 – Architectural Coatings was circulated for a 30-day public review and comment period from September 25, 2003 to October 24, 2003. Three public comment letters were received. Responses to the comment letters, as well as the comment letters, are included in this Final EA. Deletions and additions to the text of the EA are denoted using ~~strikethrough~~ and <u>underlined</u>, respectively.

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CHAPTER 1

PROJECT DESCRIPTION

INTRODUCTION

Rule 1113 – Architectural Coatings, was originally adopted by the South Coast Air Quality Management District (SCAQMD) on September 2, 1977, to control volatile organic compound (VOC) emissions from architectural coatings and was amended 22 times since the adoption date. The current proposed amendments to Rule 1113 would implement, in part, the 2003 Air Quality Management Plan (AQMP) control measure CTS-07 – Further Emission Reductions from Architectural Coatings and Cleanup Solvents, which calls for further reduction of VOC emissions from various architectural coating categories used in this industry. This control measure was also part of the 1999 Amendment to the 1997 Ozone State Implementation Plan (SIP) Revision for South Coast Air Basin, which is also consistent with the settlement agreement for the 1997 litigation between the SCAQMD and the Natural Resources Defense Council (NRDC), the Coalition for Clean Air (CCA) and Communities for a Better Environment (CBE).

Rule 1113 was amended on November 2, 1996 to achieve approximately 17.5 percent (10.3 tons per day (tpd)) emission reductions. An additional 38 percent (21.8 tpd) emission reduction was achieved with the amendment of December 6, 2002. Between these two amendments, 55 percent emission reduction was achieved. A 20 percent (10 tpd) emission reduction, as required by CM#03 CTS-07, necessitates the development and commercialization of zero– and low-VOC architectural coatings in certain large-volume categories. SCAQMD staff identified stains, waterproofing sealers, and clear wood finishes as large-volume coatings that contribute over five tpd of VOC emissions to the atmosphere.

Proposed Amended Rule (PAR) 1113 would lower VOC content limits for the following coating categories: clear wood finishes (varnish and sanding sealers), waterproofing sealers, waterproofing concrete/masonry sealers, stains, and roof coatings. The proposed amendments also phase-out the one-quart or less usage exemption for clear wood finishes and expand the scope of the Averaging Compliance Option to include the categories that are proposed for a change of VOC limits.

Pursuant to the California Environmental Quality Act (CEQA) (California Public Resources Code §§21000 et seq.), a Draft Environmental Assessment (EA) was prepared to analyze potential adverse environmental impacts from implementing the amendments to Rule 1113. No environmental topic area was identified that could be significantly adversely affected by the proposed amended rule.

LEGISLATIVE AUTHORITY

The California Legislature created the SCAQMD in 1977 (Lewis-Presley Air Quality Management Act, Health and Safety Code §§40400 et seq.), as the agency responsible for developing and enforcing air pollution control rules and regulations within the SCAQMD's area of jurisdiction. By statute, the SCAQMD is required to adopt an AQMP demonstrating compliance with all state and national ambient air quality standards for the SCAQMD's area of jurisdiction [Health and Safety Code §40460(a)]. Furthermore, the SCAQMD must adopt rules and regulations that carry out the AQMP [California Health and Safety Code, §40440(a)] to ensure attainment of all the state and national ambient air quality standards for ozone by the timeframes mandated under state and federal law.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

PAR 1113 is a "project" as defined by CEQA (California Public Resources Code §§21000 et seq.). The SCAQMD is the lead agency for the proposed project and is preparing the appropriate environmental analysis pursuant to its certified regulatory program (SCAQMD Rule 110). California Public Resources Code §21080.5 allows public agencies with regulatory programs to prepare a plan or other written document in lieu of an environmental impact report once the Secretary of the Resources Agency has certified the regulatory program. The Secretary of the Resources Agency certified the SCAQMD's regulatory program on March 1, 1989.

Rule 110 requires an assessment of anticipated environmental impacts as well as an analysis of feasible methods to substantially reduce any significant adverse environmental impacts. To fulfill the purpose and intent of CEQA and Rule 110, the SCAQMD has prepared this Final EA to address the potential adverse environmental impacts associated with implementing PAR 1113. This Final EA is intended to: (a) provide the lead agency, responsible agencies, decision makers and the general public with information on the environmental effects of the proposed project; and (b) be used as a tool by decision makers to facilitate decision making on the proposed project.

All comments received during the public comment period on the analysis presented in the Draft EA will be responded to and included in the Final EA. Prior to making a decision on the proposed amendments, the SCAQMD Governing Board must review and certify the EA as providing adequate information on the potential adverse environmental impacts of the proposed amended rule.

SCAQMD's review of the proposed project shows that the project would not have significant adverse effects on the environment. Therefore, pursuant to CEQA Guidelines §15252, no alternatives or mitigation measures are included in this Final EA. The analysis in Chapter 2 supports the conclusion of no significant adverse environmental impacts.

The current proposed amendments would implement, in part, the 2003 AQMP control measure CTS-07 – Further Reductions from Architectural Coatings and Cleanup Solvents. The goal of control measure CTS-07 is to further reduce VOC emissions from architectural coatings, thinning and clean-up solvents. The emission reduction objective of this control measure would be accomplished by amending two separate existing SCAQMD rules, Rule 1113 and Rule 1171 – Solvent Cleaning Operations, which are both currently undergoing rule amendment process. Therefore, the amendment promulgation projects are properly considered to be separate projects.

In general, there is little overlap between the proposed amendments for Rules 1171 and 1113 for the following reasons. Approximately 80 percent of the architectural coatings sold in California are waterbased coatings. Contractors using waterbased coatings typically use water to clean up equipment. Therefore, in practice, the proposed amendments to Rule 1171, which eliminate the exemption in Rule 1171 for architectural coatings, will have little affect on the cleanup practices for the majority of architectural coatings. Cleanup solvents used for water based coatings would likely already comply with the requirements in PAR 1171. Further, PAR 1171 will primarily affect the VOC content of cleanup solvents used for solvent-based coatings, which may result in greater use of cleanup materials formulated with exempt solvents. Potential adverse impacts of such solvents are analyzed in the Draft and Final EA prepared for PAR 1171. The Draft and Final EA for PAR 1171 are available by contacting the SCAQMD's Public Information Center or can be access online at the following internet address: http://www.aqmd.gov/ceqa.html.

For PAR 1113, a relatively small proportion of the affected coating is currently solvent-based. Based on the final VOC content requirements, these coatings will most likely be reformulated using waterbased coatings. The possible environmental effects of formulating affected coatings with waterbased technologies are analyzed in Chapter 2 of this document. As a result, the effects of the proposed amended rules are not expected to overlap to any appreciable extent. Where effects do overlap, the effects are typically beneficial. However, the cumulative effects of proposed amended Rules 1113 and 1171 are addressed in more detail in Chapter 2. Based on the preceding information, separate environmental analyses were prepared for the proposed amendments to Rules 1113 and 1171.

CEQA DOCUMENTATION FOR RULE 1113

In addition to this Final EA, a number of CEQA documents have been prepared for previous amendments to Rule 1113. The following subsections briefly summarize the major CEQA documents previously prepared for Rule 1113.

December 2002 – Final Subsequent Environmental Assessment (SEA) - Proposed Amendments to Rule 1113 - Architectural Coatings

In December 2002, the SCAQMD Governing Board readopted amendments to Rule 1113 which were originally adopted in May 1999, but vacated by the Court of Appeals on June 24, 2002. In response to the Court's decision the SCAQMD staff proposed to readopt the 1999 amendments and incorporate the modifications to the 1999 amendments that were made after the notice of public hearing was published. In connection with readopting the 1999 amendments to Rule 1113 plus the modifications, the SCAQMD staff prepared a Draft SEA to evaluate potential adverse environmental impacts of the 1999 amendments as revised. Rule 1113 was amended in 1999 to implement, in part, both the 1994 and the 1997 AQMP control measure CTS-07 – Further Emission Reductions from Architectural Coatings, which called for a reduction of the allowable VOC content limit per liter of coating from the following coating categories: industrial maintenance (IM); non-flats; primers, sealers, and undercoaters; quick-dry enamels; quick-dry primers, sealers, and undercoaters; roof coatings; stains; and waterproofing wood sealers. The 1999 amendments to Rule 1113 also added several new coating categories, bituminious roof primers, floor coatings, high temperature industrial maintenance coatings, nonflats, quick-dry primers, sealers, and undercoaters, recycled coatings, rust preventative coatings, specialty primers, zinc-rich IM primers, and waterproofing concrete/masonry sealers, as well as expand and clarify the averaging provision to provide additional flexibility to manufacturers.

July 2001 – Final Environmental Assessment - Proposed Amendments to Rule 1113 - Architectural Coatings

In July 2001, the SCAQMD Governing Board adopted amendments to Rule 1113. The amendments included the creation of a new coating category for clear wood finish brushing lacquers with an allowable VOC content of 680 grams per liter until January 1, 2005, when the clear wood finish brushing lacquers would be limited to a VOC content of 275 grams per liter. The rule amendments also established labeling and reporting requirements for brushing lacquers to ensure their proper use and thus minimize emissions. By postponing compliance with the existing VOC content limit requirement for lacquers in general, the EA prepared for this amendment concluded that 162 pounds of anticipated VOC emission reductions per day would be foregone until the clear brushing lacquers are required to comply with the final VOC content limit in 2005.

May 1999 – Final Subsequent Environmental Assessment - Proposed Amendments to Rule 1113 - Architectural Coatings

In May 1999, the SCAQMD Board adopted amendments to Rule 1113. The amendments call for a reduction of the allowable VOC content limit per liter of coating from the following coating categories: industrial maintenance; non-flats; quick-dry enamels; primers, sealers, and undercoaters; quick-dry primers, sealers, and undercoaters; stains; roof coatings; and waterproofing wood sealers. The proposed amendments to Rule 1113 also added several new coating categories, high temperature industrial maintenance coatings, rust preventative coatings, bituminious roof coatings, recycled flats and nonflats, essential public service coatings, floor coatings, and waterproofing concrete/masonry sealers, as well as expanded and clarified the averaging provision to provide additional flexibility to manufacturers. At full implementation of the amendments, the overall VOC emission reductions are anticipated to be approximately 21.8 tons per day by year 2010. On June 24, 2002, the Court of Appeal vacated the SCAQMD's adoption of the 1999 amendments.

November 1996 – Final Subsequent Environmental Assessment - Proposed Amendments to Rule 1113 - Architectural Coatings

In November 1996, the SCAQMD Board adopted amendments to Rule 1113. These amendments reduced the VOC content limits of four coating categories: lacquers, flats (interior and exterior), traffic coatings, and multi-color coatings, resulting in an overall net reduction of 10.3 tons per day of VOC emissions from this source category. In addition, the amendments temporarily increased the VOC content limits for four coating categories. Other components of the proposed amendments included addition of and modification to some definitions, updating the analytical test methods, and establishing an averaging methodology for flats to provide flexibility for complying with future VOC content limits.

Subsequent to the adoption of the amendments to Rule 1113, industry filed three separate lawsuits, questioning the validity of the proposed future limits for the lacquer and flat coating categories. The SCAQMD has prevailed in all three cases.

August 1996 – Final Environmental Assessment - Proposed Amendments to Rule 1113 - Architectural Coatings

These amendments incorporated an exemption from the VOC limits for coatings sold in containers one-quart size or less. The analysis in the Final Environmental Assessment concluded that adopting a small container exemption would result in significant adverse air quality impacts.

February 1990 - Determination of No Significant Impacts - Proposed Amendments to Rule 1113 - Architectural Coatings.

In February 1990, the SCAQMD Governing Board adopted amendments to Rule 1113 - Architectural Coatings, that were based on the California Air Resources Board (CARB) and California and Air Pollution Control Officers Association (CAPCOA) Suggested Control Measure (SCM). The 1990 amendments included the following provisions: exemptions for 11 categories of specialty coatings were eliminated, leaving only exemptions for quart or smaller containers and emulsion type bituminous pavement sealers; lower VOC content limits for 15 new coating categories; technology-forcing low VOC limits for ten existing coating categories effective December 1, 1993; consolidation of the industrial maintenance coating categories from ten to three; and reorganization of the subdivisions of the rule.

The 1990 Court Order

In 1990, the Dunn-Edwards Corporation challenged the 1990 amendments to Rule 1113 in court (Dunn-Edwards Corporation, et. al. v. SCAQMD). That case challenged, in part, the CEQA document prepared for the amendments to Rule 1113 adopted in February 1990, specifically the amendments that lowered the VOC limits for the following six coating categories: industrial maintenance high temperature coatings; industrial maintenance anti-graffiti coatings; industrial maintenance primers and topcoats; lacquers; quick-dry primers and sealers; and quick-dry enamels. The lawsuit alleged that the CEQA document was inadequate because it did not fully analyze potential significant adverse air quality impacts in seven areas that were alleged to arise from implementing the lower VOC content limits. The SCAQMD prevailed in six of the seven alleged impact areas, but the lower court requested the SCAQMD to further study whether or not illegal thinning of coatings in the field resulted in a negative air quality impact before readopting the February 1990 amendments.

The results of an architectural coatings field study undertaken during the latter half of 1998 by CARB staff, with the help of local air pollution control and air quality management district personnel, suggest that there is not a significant amount of illegal thinning resulting in noncompliant architectural coatings. Thirty-six percent of the coatings sampled were solvent-borne. Fifty-three percent of these were thinned with material containing volatile organic compounds. However, of all of the solvent-borne coatings sampled, only 14 percent were thinned and noncompliant with district rules. Overall, solvent-borne thinned, noncompliant coatings made up only five percent of all the coatings observed.

While the SCAQMD agreed to study the illegal thinning issue, the plaintiff appealed the court's decision to dismiss their claims regarding the six other potential air quality impacts. In 1993, the Court of Appeals in a published decision (Dunn-Edwards Corporation, et. al. v. SCAQMD) rejected the plaintiffs' appeal. Plaintiffs then appealed the appellate decision to the California Supreme Court that denied review on December 2, 1993.

Other Rule 1113 Amendments

Rule 1113 has been amended a number of times since January 1, 1990, as summarized in the following bullet points. For each amendment described below a Notice of Exemption was prepared.

- **March 8, 1996 -** These amendments established a definition for aerosol coatings consistent with the CARB, revised the definition of exempt compounds by referencing Rule 102 - Definition of Terms, and created an exemption for aerosol coatings.

- **September 6, 1991-** These amendments created a new coating category, low-solids stain, and also incorporated a calculation method for determining VOC content on a materials basis. The amendment also prohibited use of Group II exempt compounds, including ozone-depleting chlorofluorocarbons (CFCs) and several toxic solvents.

- **December 7, 1990 -** These amendments incorporated new definitions for specialty coatings and established a specific VOC content limit in the table of standards.

- **November 2, 1990 -** These amendments incorporated new definitions for specialty coatings and established a specific VOC content limit in the table of standards.

- **February 2, 1990 -** These amendments incorporated new definitions for specialty coatings and established a specific VOC content limit in the table of standards.

PROJECT LOCATION

The SCAQMD has jurisdiction over approximately 10,743 square miles (referred to hereafter as the district), consisting of the four-county South Coast Air Basin (Basin), the Riverside County portions of the Salton Sea Air Basin (SSAB) and the Mojave Desert Air Basin (MDAB). The Basin, which is a subarea of the district, is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto mountains to the north and east. The Basin includes all of Orange County and the nondesert portions of Los Angeles, Riverside, and San Bernardino counties. The Riverside County portions of the SSAB and MDAB are bounded by the San Jacinto

Mountains in the west and spans eastward up to the Palo Verde Valley. The federal nonattainment area (known as the Coachella Planning Area) is a subregion of Riverside County and the SSAB that is bounded by the San Jacinto Mountains to the west and the eastern boundary of the Coachella Valley to the east (Figure 1-1).

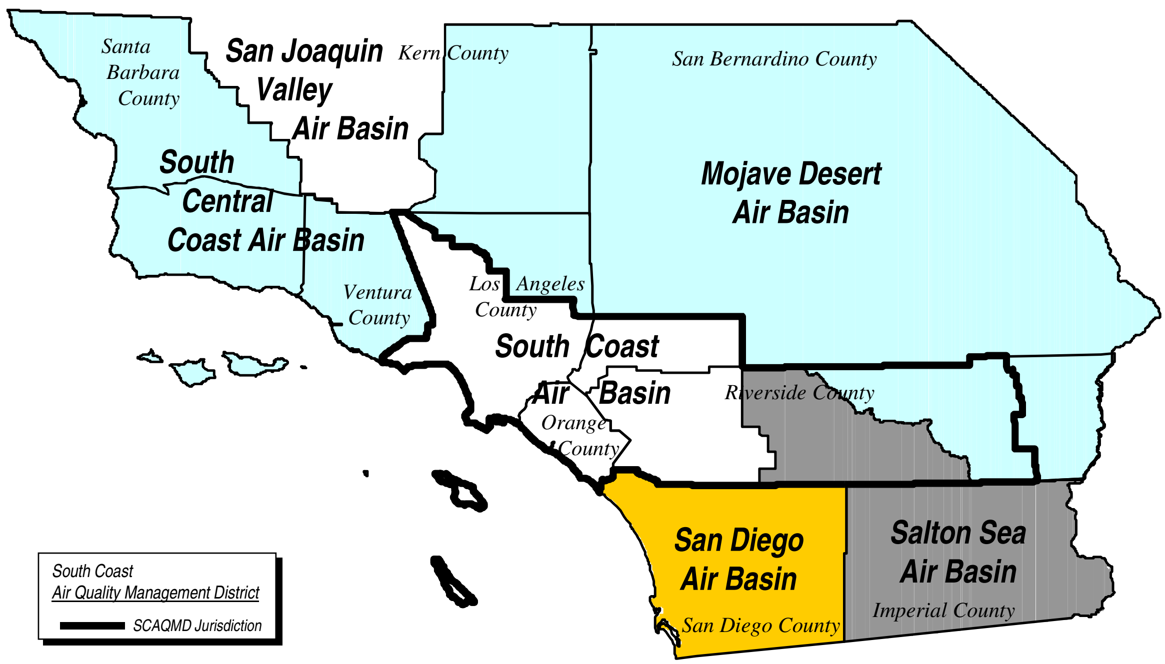

FIGURE 1-1

South Coast Air Quality Management District

PROJECT OBJECTIVES

The objective of the current proposed project is to implement, in part, control measure CTS-07 - Further Emission Reductions from Architectural Coatings and Cleanup Solvents, from the 2003 AQMP; achieving a reduction in VOC emissions from architectural and industrial maintenance (AIM) coatings to ensure attainment of the state and national ambient air quality standards for ozone by the timeframes mandated under state and federal law. Implementing this control measure also satisfies the settlement agreement for the 1997 litigation between the SCAQMD and the Natural Resources Defense Council, the Coalition for Clean Air and Communities for a Better Environment.

BACKGROUND

AIM coatings are used to beautify and protect homes, office buildings, factories, and their appurtenances on a variety of surfaces - metal, wood, plastic, concrete, wallboard, etc. For example, AIM coatings are applied to the interior and exterior of homes and offices, factory floors, bridges, stop signs, roofs, swimming pools, driveways, etc. AIM coatings may be applied by brush, roller or spray gun; by residents, painting contractors, or maintenance personnel.

AIM and other coatings are composed of: pigments, which give the paint its color and ability to hide the underlying surface, and are generally in the form of finely ground powders; binders (resins), in which the pigment particles are dispersed and that bind the pigment to the painted surface; carriers (solvents), used to keep the paint in a liquid state during application, and to otherwise aid in the application of the paint; and specialty chemicals (additives), necessary for other coating characteristics. The carriers and some specialty chemicals evaporate, leaving behind the film-forming components of the coating. The resins used in AIM coatings include acrylics, vinyls, alkyds, cellulosics, epoxies, urethanes, polyurethanes and several others. The carriers in solvent-based coatings are organic solvents such as alcohols, ketones, esters, glycols, glycol ethers, and aromatic or aliphatic hydrocarbons, and are usually VOCs. The carrier in a waterborne coating is water, although most waterborne coatings contain some VOCs, primarily glycols or texanol.

AIM coatings are usually purchased ready-to-use, although some come in two components that must be mixed prior to application. They are available in a wide range of colors, gloss, and performance characteristics. One important criterion for selecting coatings is durability. Coatings are expected to last from two to 10 years with the average expectation of five to seven years. Failure of coatings to stand up to the elements such as sunlight, weather, and cleaning can shorten the life of the coating and require more frequent recoating.

A solvent may sometimes be used to thin a coating if it is too thick to spray or brush. Application problems caused by low temperature and high humidity can also be overcome by the addition of solvent to the coating. Waterborne coatings are thinned with water only, whereas solvent-based coatings can only be thinned with organic solvents. Similarly, brushes, rollers, and spray guns used with waterborne coatings are cleaned with water, while such equipment used with solvent-based coatings use organic solvents for cleanup. Generally, coatings are sold as ‘ready-to-use’ to eliminate the need for thinning in the field.

VOC emissions from architectural coating operations are regulated by SCAQMD Rule 1113. Under this rule, emissions are controlled by limiting the VOC content, measured in grams per liter, of the architectural coatings sold and applied in the district.

Architectural coatings are defined by their application and use and include coatings which are applied to stationary structures including residential and commercial buildings; billboards; curbs and roads; and mobile homes. VOCs are emitted to the atmosphere from the evaporation of organic solvents used in industrial maintenance coatings, nonflats, flats, primers/sealers/undercoaters, waterproofing wood sealers, varnishes, wood preservatives, lacquers, fire retardant coatings, etc. The existing rule and PAR 1113 apply to those persons who supply, sell, apply, solicit the application of, and manufacture such coatings.

SCAQMD Architectural Coating Study with AVES and Adhesives Coating Company

The SCAQMD awarded a contract to AVES (RFP#9899-14 approved and released November 13, 1998 and closed on January 29, 1999), an affiliate of ATC Associates Inc., to develop new formulations of architectural coatings with a zero- or near-zero VOC content. The coatings developed under this contract included exterior opaque stains, exterior and interior semitransparent stains, waterproofing sealers (clear), clear wood finishes, (lacquers), varnishes and sanding sealers. Along with the development of the coatings, the contract also required comparative side-by-side testing for performance and repairability of the new coatings, and coatings currently in commercial use by the industry, as well as a field demonstration. AVES teamed with Adhesives Coating Company (ADCO) who developed and patented a zero-VOC water-based resin technology used in the new formulations. Since the start of this contract, major manufacturers have developed their own new resin technologies for low-VOC coatings compliant with future VOC content limits (see "Description of Affected Architectural Coatings Categories" section and Appendix B for a listing of such coatings).

<u>Resin Technologies</u>

During the 1990s, numerous manufacturers have developed and marketed acrylic-based, waterborne coatings that exhibit performance characteristics equivalent to or superior to the traditional solvent-based coatings. The first generation of waterborne coatings had stability, rheology, water-immersion, loss of gloss, lack of corrosion resistance, loss of drying capacity, and bacterial degradation problems. However, subsequent formulations, using a new generation of performance enhancing additives, as well as innovative resin technologies, have minimized the problems to a practical level, or completely eliminated them. Technology breakthroughs include the following:

- Flow and leveling agents that mitigate the flow problems, even on substrates like plastic, glass, concrete, and resinous wood. These additives even assist in overcoming flow and leveling problems when coating oily or contaminated substrates.

- Pigment-wetting agents have assisted in better dispersion of organic pigments in an aqueous media by altering their hydrophobic (ability to unite with water) nature. This results in better rheology (study of the change in form and flow of matter) characteristics.

- Defoamers and microfoam agents have mitigated the bubble retention problems, thereby eliminating the loss of drying capacity, and thus improving the film.

- Biocides that are not susceptible to degradation by hydrolysis have provided good stability and eliminated the settling problems.

With the development of these additives, some waterborne coatings now perform better than solvent-based coatings. The biggest issue with waterborne coatings is the dry time. Water, with its slower evaporation rate and higher latent heat of evaporation, does not have the latitude that solvents do with their wide range of evaporation rates and boiling points. On a warm, dry day, waterborne coatings dry faster than the high-solids, solvent-based coatings, but the dry times can be significantly extended on cold, humid days, which cause problems in some areas. However, with the development of non-volatile, reactive diluents combined with hypersurfactants, performance of these nearly zero-VOC coatings has equaled, and in some characteristics, outperformed traditional, solvent containing coatings.

The durability of a coating is governed by the nature of the binder (also known as film formers or resins) used in its formulation. Typical coated substrates are exposed to a variety of influences of daily life, including mechanical stresses, chemicals and weathering, against which they serve to protect the substrate. The major impact on the exterior coating film is oxidation by exposure to light, causing the film to first lose color and gloss, and gradually become brittle and incoherent. This is mainly caused by a process known as photochemical degradation. This is especially the case for coatings used for exterior painting.

The coatings industry has developed a variety of additives that act as ultraviolet light (UV) absorbers or free-radical scavengers that ultimately slow down the photo-oxidative process, thereby increasing the coating life. Antioxidants and sterically hindered amines are two classes of free-radical scavengers, also known as hindered amine light stabilizers (HALS). These can be used with solvent-free or waterborne coatings. Other additives that have positive effect on durability of coatings include adhesion promoters, corrosion inhibitors, curing agents, reactive diluents, optical brightners, and algaecides/mildewcides.

Formulating Candidate Coatings

The goal of the project was to develop and demonstrate zero-VOC or low-VOC coatings (varnish, lacquer, interior and exterior stains, waterproofing sealers, waterproofing concrete/masonry sealers and sanding sealers) to further reduce VOC emissions in the Basin. The current amendment to Rule 1113 is proposing to lower VOC content limit requirements for the same coatings.

The task to develop these coatings was focused on making the necessary formulation adjustments to ADCO's patented polymer emulsion. This emulsion was used as the basis for formulating the required stains, sealers, and clear wood finishes while producing products with VOCs less than ten g/l (calculated from GC/MS analysis results).

The target in developing the coatings was to achieve a performance level equal to, or better than that of similar coatings widely used by the industry. The performance characteristics in the new coatings were focused on the following areas: hardness, hot/cold check, adhesion, printing/blocking, household chemical resistance, drying time, moisture resistance, UV resistance, freeze/thaw, orange peel, leveling, sagging, film thickness, mildew/fungus resistance, dirt pick-up, substrate penetration, stain blocking, water repellant efficiency, beading, swelling, moisture vapor transmission, scrape/mar resistance, color change, sprayability, clarity, depth, gloss, graininess, etc.

The characteristics of the raw materials are of great importance to the creation of a waterborne resin system that dries quickly and exhibits good initial film properties without coalescing solvents. Particle size, minimum film forming temperature, glass transition temperature, resin polarity, and dynamic surface tension are among the most important factors to consider in the formulation.

Conclusions from the AVES Study

The following conclusions from the side-by-side comparison testing and field demonstrations were extracted from the Final Report on the "Development and Demonstration of Zero-and Low-VOC Resin Technology for Advanced Control Measure Development" (SCAQMD, March 29, 2001):

1. Most performance characteristics of the new no-VOC wood coating system (including adhesion, beading, chemical resistance, coating penetration, dirt pick-up, mar resistance, moisture vapor transmission, swelling, water uptake, and overall appearance) were equivalent to those of commercial coatings based on the side-by-side comparative testing results. Advantages of these no-VOC coatings include better grain raising for varnish, less color change (for lacquer, varnish, and sanding sealer), better moisture/UV resistance for exterior semitransparent stain, and better water repellent efficiency for waterproofing sealer. However, the dry time, freeze/thaw

properties, pot life, mildew/fungus resistance, printing resistance, and stain blocking properties of these no-VOC waterborne coatings were not as good as those of solvent-based coatings.

2. Three popular commercially available waterborne and solvent-based coating systems (both lacquer and varnish) were tested side-by-side with no-VOC lacquer and varnish topcoat systems for repair and refinishing. The new no-VOC varnish system showed the best overall appearance after repair, but had the highest coating usage because the two-component coating resulted in a limited pot life. The new no-VOC Lacquer system was the easiest to repair and showed the best gloss difference after repair.

3. In order to obtain the impartial opinion of experienced painters on the performance of the new coatings, the painters of Commercial Casework, Inc. in Fremont, California conducted a field demonstration of the new coating system as part of this study. The personnel from Commercial Casework were impressed with the new wood coatings due to faster dry times, ease of use, good appearance qualities, and the safer working environment resulting from the absence of solvents.

Case Studies (USEPA and Midwest Research Institute)

In cooperation with Midwest Research Institute, in May of 2000 the United States Environmental Protection Agency (USEPA) published a work of case studies (EPA-600/R-00-043) regarding the conversion of 25 wood furniture facilities to less polluting coating technologies including high-solids conversion varnishes, waterborne technologies, ultra-violet curable and powder coating. Because of the proposed VOC limits for clear wood finishes for (sealers and varnishes) and of future existing VOC limits for clear and pigmented lacquers, architectural wood coating operations will be limited in choice of higher solids (30-45 percent solids), exempt solventborne catalyzed topcoats, sealers and stains, and may not choose their use because of flammability concerns of the exempt solvents of acetone and methyl acetate. Ultra-violet curable and powder coating operations are simply not applicable to the realm of architectural wood finishing applications. It is then nonflammable the waterbornre acrylic and urethane finishes (stains, primers, sealers and topcoats) that wood product manufacturers have converted to have applicability to Rule 1113. Out of the 25 conversions, nine converted from high-VOC wood finishes to waterborne finishing systems. Several different reasons for converting to low HAP (hazardous air pollutant), low-VOC material are cited. Four apply to Rule 1113: (1) less hazardous materials; (2) a commitment to the environment; (3) a desire for a high-quality finish; and (4) a reduction in emissions.

The application of waterborne stains, sealers and topcoats is different than solventborne ones and may give rise to difficulties. However with proper training all problems encountered by the facilities of the USEPA report that switched to waterborne materials were minimized if not solved. For instance, waterborne coatings cannot be flooded on as standard nitrocellulose products are, they should be applied in thinner films to prevent coating softness and sagging. The USEPA document states that grain raise issues were also minimized, and for some conversions resulting sanding steps were the same as that used with high solvent coatings and stains, they just came in a different order. Once proper drying and sanding has occurred, waterborne systems have harder films than standard one-component nitrocellulose systems and can be tinted to achieve an amber look if desired.

Color matching was pointed out in the document as being more difficult with waterborne stains, however, with respect to Rule 1113 staff is not recommending lowering the VOC limit for high solids stains (formulated both in solvent and in water at 250 grams VOC per liter, less water and less exempt compounds). Restrictions for stains purchased in small containers are not being recommended either, which will allow the use of high VOC low-solids stains for maximum depth of penetration and color uniformity. In the USEPA case study paper a close association with coatings manufacturers usually remedies waterborne stain problems satisfactorily primarily with the addition and optimization of surfactants. Waterborne dye stains are also available which improve color uniformity.

Kitchen Cabinet Manufacturer's Association Standards

The Kitchen Cabinet Manufacturer's Association (KCMA) sets standards for the strength of cabinetry and the durability of applied coatings under the American National Standards Institute Approved ANS/KCMA A161.1-2000. In order to pass the KCMA test and carry the KCMA approval rating the coating is subject to the following:

(1) Finishes must withstand 120 degrees F@ 70 percent relative humidity for 24 hours without showing appreciable discoloration and not showing evidence of blistering, checking, or other film failures.

(2) A similar hot and cold cycle (120 degrees F to room temperature and then to -5 degrees F) repeated five times without film failures

(3) Exposure to vinegar, lemon, orange and grape juices, catsup, coffee, olive oil, and 100 proof liquor for 24 continuous hours and mustard for one hour, without showing discoloration, stains, or whitening (that will not be dispersed by ordinary polishing) and cannot blister, crack or show film failures of any kind.

(4) Cabinet door edge 24 hour submersion in soapy water without delaminating, or swelling, and no film failure.

There are several compliant waterborne coatings that pass the KCMA tests. Manufacturers of these coating include SDA/Craft Technologies and Fuhr. SDA/Craft products are also used in field applications.

ARCHITECTURAL COATING EXISTING EMISSIONS INVENTORY

AIM coatings represent one of the largest non-mobile sources of VOC emissions under the district jurisdiction -- larger than petroleum refining. CARB has conducted architectural coating surveys every four or five years with previous surveys conducted in 1976, 1981, 1985, 1989, 1993, 1998 and 2003. The purpose of the surveys is to gather current information on the VOC content and sales volume of architectural coatings. CARB evaluated the data on architectural coatings sold in California collected with the latest survey conducted in 2000. It is titled 2001 Architectural Survey Draft Report (CARB Survey). The CARB Survey identified about 108 million gallons of architectural coatings sold in California in 2000, with 84 percent of that volume coming from waterborne products and 16 percent from solvent-borne products. Total California emissions from these coatings are approximately 43,300 tons of VOC per year or about 119 tons per day as an annualized daily average. Waterborne products contributed 44 percent of these emissions, while the solvent-borne products contributed 56 percent.

The emission inventory is calculated by multiplying the sales volume by the sales weighted average actual-VOC content. Staff adjusted the baseline inventory prepared by CARB for the SCAB to account for sales of: (a) coatings below the proposed VOC limit which were excluded from the inventory since these coatings are already compliant; (b) coatings above the current SCAQMD VOC limits assumed by CARB to be compliant and (c) small exempt containers. This establishes an adjusted emission inventory in order to calculate the emission reductions for the proposed amendments.

According to control measure CTS-07 in the 2003 AQMP, the VOC emissions in the district from the use of architectural coatings based on the 1997 Annual Average Inventory is estimated at 50.9 tons per day (tpd). Based on the Annual Average Inventory, the VOC emissions for 2006 and 2010 are projected as 32.7 tpd and 24 tpd, respectively, without additional controls on architectural coatings. The inventory decreases between years 2006 and 2010 because existing rule requirements have future compliance dates which will lower the VOC content limit of different coatings. Table 1-1 lists the current estimated usage and emission inventory for the coating categories subject to PAR 1113.

TABLE 1-1

VOC EMISSIONS INVENTORY FOR
AFFECTED COATING CATEGORIES in the SCAQMD

Categories	Estimated Usage* (gallons)	Emission Inventory* (tons/day)
Clear Wood Finishes (Varnishes)	196,247	0.63
Clear Wood Finishes (Sanding Sealers)	5,295	0.01

TABLE 1-1 (CONCLUDED)

VOC EMISSIONS INVENTORY FOR
AFFECTED COATING CATEGORIES in the SCAQMD

Categories	Estimated Usage* (gallons)	Emission Inventory* (tons/day)
Clear Wood Finishes (Quart Exemption Removal)	229,140	1.22
Roof Coatings	937,078	1.95
Stains	1,098,176	0.93
Waterproofing Sealers/ Waterproofing Sealers (Concrete and Masonry)	373,339	0.79
TOTAL	**2,839,275**	**5.53**

* adjusted from state of California reported sales based on population (SCAQMD = 45 percent of the state's total population)

DESCRIPTION OF AFFECTED ARCHITECTURAL COATING CATEGORIES

Installation of air pollution control equipment is not feasible for reducing AIM coatings emissions, thereby leaving coating reformulation as the only possible means to achieve the required reductions. The current proposal emphasizes reformulation of existing coatings, primarily by using currently available, technologically-innovative resins, as well as utilizing the growing list of solvents from the definition of Exempt Compounds. The following sections describe the existing and new coating categories, and their typical usage and application. In addition, the sections provide the compounds or resin systems used to reformulate and achieve a lower VOC content limit for each coating category.

Clear Wood Finishes (Varnishes and Sanding Sealers)

Clear wood finishes are clear and semi-transparent coatings, including lacquers and varnishes, applied to wood substrates to provide a transparent or translucent solid film. Varnishes are formulated with various resins to dry by chemical reaction on exposure to air. Sanding Sealers are clear wood coatings formulated for or applied to bare wood for sanding and to seal the wood for subsequent application of coatings. Either may be applied to various products consisting, but not limited to, cabinets, doors, molding, paneling, windows, decks, benches, siding and floors. There are three types of low-VOC clear wood finishes: waterborne, exempt solvent-borne, and high-solids. Several resin systems are available including acrylic, polyurethane, alkyd, and various copolymers or modifiers including but not limited to latex, polycarbonate, polyethylene, and urea. Many cure types are also available as one-component air-dried pre-catalyzed, and two-component post-catalyzed. Different cure types are necessary to assure proper durability for specific applications, whether they are for interior, exterior or for flooring use.

Appendix B lists numerous clear wood coatings that meet the proposed limit. The following is a brief discussion of specific compliant products listed in Appendix B, highlighting key characteristics and testing data.

BonaKemi USA manufactures and sells the BonaTech MEGA® Brand Floor Finish that has a VOC of 250 g/l. This product is specifically designed for use on heavy-traffic interior residential and commercial wood flooring. The resin system used in this single-component product is a polyurethane. Independent testing conducted by Colorado State University and the Taber Abraser testing indicate that the "MEGA® outperforms all other competitor's waterborne and oil-modified finishes."

Farwest Paint Manufacturing Co. manufactures and sells a Semi-Gloss Aquathane Waterborne Floor Finish comprised of a modified aliphatic urethane dispersion. The technical information indicates that the product is "primarily designed as a high abrasion resistant coating for hardwood floors; but is widely used for kitchen cabinets, coffee tables, fine wood furniture, table tops, clear wood trim varnish, etc." The solids content is greater than conventional nitrocellulose lacquers, making film build and aesthetics better than a conventional system. The VOC content is 186 g/l.

Fuhr International manufactures and sells the Multi-Purpose Ultra Clear Urethane, which is a waterbased self-sealing, self-cross linking, modified urethane finish. This product was originally designed for hardwood flooring, but has also been used on high end furniture, passage doors, millwork, windows and cabinetry for both interior and exterior uses. The VOC content is 160 g/l and the product can be used in the field or in the shop. Fuhr International also manufactures a Waterborne Acrylic Varnish, a waterbased, self-sealing, self-cross linking finish, and is recommended for use on furniture, molding, passage doors, millwork, and wine racks. The VOC content is 73 g/l, and the product meets the KCMA finish coat testing requirements for the kitchen cabinet industry.

ICI/Dulux manufactures and sells the WOODPRIDE™ Interior Waterborne Aquacrylic Gloss Varnish with a VOC content of 191 g/l, comprised of a hybrid acrylic/urethane technology. The technical information indicates that this product "provides durable, transparent protection for interior wood surfaces such as cabinets, doors, woodwork, paneling, furniture and floors." The product is also resistant to abrasion, chipping, marring, water, oil, alcohol and blushing.

Roof Coatings

Roof coatings are coatings formulated for application to exterior roofs and for the primary purpose of preventing penetration of the substrate by water, or reflecting heat and ultraviolet radiation. Roof coatings are generally applied as a system, that is, as primers, base coats and reflective topcoats. There are a variety of primers and coatings applied to bituminous, modified bituminous, roofing materials, as well as metal, polyvinyl chloride (PVC) and various synthetic rubber membranes, which include, but are not limited to, ethylene-propylene terpolymer (EPDM), neoprene, chlorosulfonated polyethylene (CSPE, Hypalon), chlorinated polyethylene (CPE) and butadiene-acrylonitrile (nitrile rubber), polyisobutylene (PIB) and expanded polyurethane foam roofing. Other roof coatings can be applied to clay, concrete, wood shingles, and slate to extend their life. Primers are usually applied to smooth and granule surfaced asphalt, modified bitumen, metal, and can be applied to polymer roofing materials such as CSPE, CPE, PVC, and urethane foams, prior to a base coat or reflective topcoat. As the second part of the coating system, base coats have adhesive qualities, and asphalt, clay-stabilized emulsions comprise most base coats today. Lastly, reflective coatings are typically categorized as aluminum emulsion roof coatings and "white" reflective coatings. High VOC aluminum coatings still exist today, however, waterborne aluminum paste reflective coatings are in use as well and are fast replacing the high VOC variety. The acrylic and ceramic/acrylic blends provide the highest solar reflectance.

The following are representative samples of base coats and topcoats that meet a VOC limit of 50 grams of VOC per liter, less water and less exempt compounds. All data is reflective of information obtained from technical and material safety data sheets.

Geocel 9500MB – Elastomeric Coating is a product specifically for application to metal roofs and siding and is a blend of polymers and EPDM and forms a rubber membrane that is flexible, ultra violet (UV) light and mildew resistant, has 5 year durability limited warranty and may be brushed, rolled or spray applied. Application temperature is limited to 45 degrees Fahrenheit. The VOC content, less water is listed as 36 grams per liter.

United Coatings Roof Mate is an EPA Energy Star rated elastomeric 100% acrylic top coat for metal, built-up, modified bitumen, concrete, sprayed in place foam, Hypalon and EPDM, as well as composite shingle roofs. It forms a membrane that is highly reflective, flexible, breathable, chemical fallout and UV resistant. The product is available with 5, 10 and 15 year warranties and has a listed VOC content of 16 grams per liter, less water, and is sprayable.

Tropical Asphalt #360 Asphalt/Clay Emulsion Basecoat is a product designed as a basecoat for reflective topcoats and as a waterproofing coating. It is applications on built up roofing, metal, and masonry surfaces. A better bond occurs when roof surfaces are damp. Two coats are recommended with the use of a brush, roller or sprayer at application temperatures above 55 degrees Fahrenheit. Material should not be applied to PVC, or to dry and brittle roofing materials. The VOC content is listed as 30 grams per liter. Most base coats that meet the proposed VOC content of 50 grams per liter will be of this type.

Stains

Stains are semi-transparent (interior and exterior) or opaque (semi-solid) coatings which are generally used on wood. Semi-transparent stains are formulated to change the color but not conceal the grain pattern or texture. They are lower in solids (15-20 percent) and therefore form a barely visible coating film. These types of coatings are especially used extensively in cabins and homes with soft wood exterior siding, as well as deck coating. They protect the wood from UV exposure, moisture, and minimize tannin bleed through. Semi-transparent exterior stains do not need to be top coated with a clear finish. Opaque stains completely hide wood grain but not its texture and have high solids contents (25 to 40 percent). The category of stains will be further characterized between interior and exterior applications. Exterior stains at the proposed lower VOC content limit are currently available and are reformulated as acrylic, latex, modified acrylic and gilsonite resin systems.

Low-solids interior stains are stains labeled and formulated exclusively for use on interior surfaces that contain one pound or less of solids per gallon of material. For interior use, there are essentially two types of stains that exist. There are dye stains, which penetrate so deeply into the wood surface that to remove them requires extensive sanding, and normal penetrating stains which are less penetrating than dye stains. Both stains will change the color of a wood species and/or enhance the grain without forming a coating film. They require a sealing and a finish coating with a clear wood finish. Today's lower VOC technology has moved away from solvent-borne alkyd coating formulations to waterborne acrylic, acrylic latex and latex emulsions, gilsonite, and oil/alkyd/latex dispersions.

Appendix B lists numerous stains that meet the proposed limit. The following is a brief discussion of specific compliant products listed in Appendix B, highlighting key characteristics and testing data.

Sherwin Williams manufactures and sells the Exterior Solid Color Acrylic Latex Stain – A16 Series under their ProMar® product line that has a VOC content of 97 g/l. This is a 100 percent acrylic product recommended for use on vertical wood, rough sawn lumber, textured or abraded plywood, siding shakes, and siding shingles.

Smiland Paint Company, a local manufacturer, manufactures and sells the Exterior Acrylic Solid Color Rustic Stain for use on exterior wood, masonry, concrete, stucco, properly primed metal and previously painted surfaces. The technical data indicates that this product provides “excellent protection for rustic wood surfaces such as rough sawn lumber, vertical shakes and shingles, fences, and masonite or hardwood siding.” The VOC for this stain is 97 g/l.

Dunn-Edwards Corporation, a local company, manufactures and sells the ACRI-FLAT® product, which is listed as an Exterior Wood Stain and Masonry Flat Paint (W 704). The technical information from the manufacturer indicates that “ACRI-FLAT is extremely versatile and is ideally suited as a self-priming solid color stain for new or previously painted rough sawn wood." The VOC content of this product is 70 g/l.

Okon Co. manufactures and sells a product called DECK STAIN, which is a water-based water repellent and wood stain for horizontal wood applications. This product is designed for decks, milled, pressure-treated, and rough lumber. ASTM testing results show that this product performs equally or better than its higher-VOC counterparts. For example, this product passes the QUV 1,000 hour test for Ultraviolet light resistance, as well as ASTM D3359-90 for vapor transmission. The VOC content of this product is ~100 g/l.

Columbia Paint & Coatings manufactures and sells the Woodtech Solid Color Pre-Stain (09-870), a low VOC (62 g/l) interior and exterior bare wood substrates. The technical information from the manufacturer indicates "excellent color retention, good penetration, and recoat properties." The company representative indicated that this product forms a hard film that is abrasion resistant.

Epmar Corporation also manufacturers and sells a variety of low-VOC stains, including pigmented, clear, and semi-transparent. The Kemiko Transparent Stain is a single component product recommended for use on concrete, plaster, polymer cement, and wood. Applications include walkways, decks, hospitals, schools, shopping malls, restaurants, and theme parks. The VOC content is less than 30 g/l.

Fuhr International manufactures a Wiping Stain that has a VOC content of 15 g/l. This product is recommended for any wood surface and does not affect grain raising, and is available in an unlimited range of colors. The technical information from the manufacturer indicates good open time and workability for wiping applications. Fuhr International also manufactures a ZVOC® Exterior Waterbased Stain that provides "excellent substrate wetting and color control, overall durability, and chemical resistance, with minimal grain raising." This product has no VOCs

Waterproofing Sealers/ Concrete and Masonry Waterproofing Sealers

Waterproofing wood sealers are used to protect wood, and other porous surfaces to seal against moisture damage. On wood, the use of waterproofing sealers can prevent splitting, staining, and warping, as well as maintain the wood's true color and grain. These coatings rely on a variety of recently developed resin technologies, such as acrylic emulsion formulations and acetone-based formulations. There are three fundamental types of sealers: (1) penetrating sealers (low solids, approximately 5 to 15 percent solids by weight), (2) film forming (15 to 30 percent solids by weight), and (3) high build coatings ranging from 45 to 100 percent solids. Penetrating sealers do not form a visible continuous coating film and are usually formulated with silicone, silicates, or silane/siloxane waterborne micro emulsions. The silicone variety fills the pores of the substrate, whereas the silane/siloxane variety are said to react with concrete to form both a chemical and mechanical bond. Low-VOC film forming waterproofing sealers are typically acrylic and modified acrylic (urethane and epoxy copolymers for example) emulsions that are applied in two or more coats. High build waterproofing sealers are available in two-component epoxy, and single-component moisture-cured polyurethane for below grade hydrostatic and hydraulic pressure resistance. Other materials that are high build in nature are elastomeric, which means they can form a rubberized membrane and are available in latex, acrylic, butyl rubber and asphaltic formulations.

Concrete and masonry waterproofing sealers provide the same water resistance as typical waterproofing sealers, but also protect the surface from inherent properties of concrete and masonry such as alkalinity and acidity reactions. In addition, they are formulated to resist ultraviolet (UV) light and to avoid staining.

Appendix B lists numerous waterproofing sealers and waterproofing concrete/masonry sealers. The following is a brief discussion of specific compliant products listed in Appendix B, highlighting key characteristics and testing data.

Davlin Coatings, Inc. manufactures and sells a waterproofing sealer (Acrylastic 490) that is marketed as a high-build, decorative, extremely flexible, high performance waterborne waterproof wall coating. It is recommended for use over cracked, uneven surfaces, especially where water penetration is a problem. The VOC content is 29 g/l, well below the proposed limit for waterproofing coatings. Testing, based on widely accepted ASTM methods, indicates excellent performance for tensile strength (ASTM D2370 – 2,400 l in./min), moisture vapor transmission (ASTM E96, Proc. B – 1.2 perms), peel adhesion, concrete (ASTM D413 – 48 psi), alkali resistance (Fed. Spec TT-C-555B, GSA ex. l – no effect), and resistance to wind-driven rain > 100 mph (Fed. Spec. TT-C-555B – no weight gain). These results are equal or superior in terms of overall performance when compared to higher-VOC counterparts. Overall life of the coating is estimated to be double the performance of competitors.

Everest Coatings manufactures and sells EVERCOAT 7000S, High Modulus Waterproof Coating, a single component product conceals irregularities, fills cracks, and provides excellent waterproofing on a variety of masonry substrates. This coating utilizes acrylic resin technology supplied by Rohm and Haas, and has a VOC of 69 g/l, with a percent solids vol. of 60 percent. This product exhibits excellent resistance to the elements and U.V. degradation, has alkali-resistant pigments, and is mildew resistant. The recommended uses include aged, new and previously painted above-grade masonry, concrete, concrete block, and stucco.

GE Sealants & Adhesives, manufactures and sells VP1550 CONCENTRATED WATER REPELLANT (VIP1550), which is a high performance, breathable, clear, water repellant sealer that penetrates deeply into concrete and masonry surfaces without altering the natural appearance of the substrate. This product contains silanes/siloxanes and is recommended for use on concrete driveways, walkways, brick paver and patio deck steps, as well as vertical masonry surfaces including stone, tilt-up concrete, brick, clay tile, and block.. The VOC content is 0.5 g/l, and the product provides excellent water repellency to reduce cracking, spalling, freeze/thaw damage, chemical degradation, biological growth, efflorescence and dirt pickup.

L&M Construction Chemicals, Inc. manufactures Aquapel & Aquapel Plus, a micro-emulsion, silane/siloxane water repellant that bonds directly with the substrate, resulting in very good resistance to moisture and salt, and has a VOC of less than 50 g/l. This product is recommended for use on buildings, parking decks, monuments, garages, driveways, dams, piers or any other concrete surfaces. Technical data from the manufacturer indicates that reduced water adsorption by 85 percent and chloride intrusion by up to 90 percent. Both products exceed NCHRP 244, Series II requirements for salt and water penetration.

Rainguard International Products Company, a local manufacturer, manufactures and sells Blok-Lok®, a clear water repellant with a VOC content of 37 g/l that is comprised of polysilanes. This product is recommended for use on masonry block, concrete, stucco, cement plaster, and other composite construction materials. Testing based on ASTM procedures conducted by the manufacturer shows that the product has equal or superior performance to its higher VOC counterparts. For example, ASTM E-514-86, Wind Driven Rain tests indicate that the use of Blok-Lok® reduces leak by 98.7 percent, reduced chloride ion intrusion (NCHRP No. 244), and allows 100 percent water vapor transmission (ASTM D-1653).

Sherwin Williams manufactures ConFlex XL, a textured high-build acrylic elastomeric coating recommended for concrete tilt-up, precast, poured-in-place concrete, CMU, and stucco. The technical information indicates "excellent flexibility, durability, and weather resistance". This pigmented waterproofing sealer has a VOC of 94 g/l. Testing done for or by Sherwin Williams, using ASTM methods, indicate elongation of 300 percent based on ASTM-D412. This coating also passes low temperature flexibility and freeze-thaw resistance tests, based on ASTM D522 and ASTM D2243, respectively.

Smiland Paint Company, under their Morwear Label, manufactures and sells a Clean Elastomeric Waterproofing Sealer (2571-70) recommended for application new or old, above grade, dense or porous concrete, stucco, and masonry surfaces. The VOC is reported to be 30 g/l, and the technical material from the manufacturer indicates that this product is suitable for damp or dry surfaces, is breathable and permeable to water vapor, and can be applied over substrates previously treated with silanes, siloxanes, urethanes, and acrylic paints. The technical data also indicates that this waterproofing sealer has "excellent elongation (440 percent), excellent tensile strength (400 psi), excellent exterior durability, and excellent water resistance." These conclusions were based on results from ASTM testing done for the above performance characteristics. Smiland Paint Company also makes and sells an interior/exterior heavy duty waterproofing (2555-70), which is an emulsion of polysiloxane resins, exhibiting a durable and invisible shield against water penetration. This product is recommended for use on "interior or exterior above-grade concrete, masonry, cement blocks, brick, stucco, stones, porous tile, exposed aggregate concrete, sandstone, and slate." The VOC content of this product is 2 g/l.

Sierra Corporation/TK Products manufactures and sells a WB Silane Concentrate Concrete Sealer (TK-1311) that has a VOC of 59 g/l. This product is a micro emulsion based on silane and oligomeric alkoxysilanes mixed with water, and testing conducted by Wacker Silicones Corporation using the NCHRP 244 test procedures, indicates that chloride and moisture intrusion is reduced by more than 80 percent.

PROJECT DESCRIPTION

The current proposed amendments would implement, in part, the 2003 AQMP control measure CTS-07 – Further Reductions from Architectural Coatings and Cleanup Solvents. This control measure was also part of the 1999 Amendment to the 1997 Ozone SIP Revision for South Coast Air Basin, which is also consistent with the settlement agreement for the 1997 litigation between the SCAQMD and the NRDC, CCA and CBE. The proposed amendments to Rule 1113 include the following components, listed in the order they appear in the rule:

<u>(a) Purpose and Applicability</u>

No changes are proposed to this subdivision.

<u>(b) Definitions of Terms</u>

- Add new definition of "Aluminum Roof Coatings" [paragraph (b)(2)]
- Add new definition for "Interior Stains" [paragraph (b)(26)].
- Remove restriction of Industrial Maintenance Coatings for residential use or for use in areas of industrial, commercial or institutional facilities not exposed to extreme environmental conditions [paragraph (b)(25)] from "Definitions" and move to a more appropriate area of the rule, "Requirements." [paragraph (c)(2)].
- The definition of "Metallic Pigmented Coatings" excludes roof coatings [paragraph (b)(34)].

(c) Requirements

- Reduce the VOC content limit for clear wood finishes (varnishes) to 275 grams per liter of coating (less water and less exempt compounds) by July 1, 2006 [paragraph (c)(2)].
- Reduce the VOC content limit for clear wood finishes (sanding sealers) to 275 grams per liter of coating (less water and less exempt compounds) by July 1, 2006 [paragraph (c)(2)].
- Reduce the VOC content limit for roof coatings to 50 grams per liter of coating (less water and less exempt compounds) by January 1, 2005 [paragraph (c)(2)].
- Reduce the VOC content limit for aluminum roof coatings to 100 grams per liter of coating (less water and less exempt compounds by January 1, 2005 [paragraph (c)(2)]
- Reduce the VOC content limit for stains to 100 grams per liter of coating (less water and less exempt compounds) by July 1, 2006 [paragraph (c)(2)].
- The new coating category, interior stains, will maintain the current VOC content limit for stains at 250 grams per liter of coating (less water and less exempt compounds) [paragraph (c)(2)].
- Reduce the VOC content limit for waterproofing sealers to 100 grams per liter of coating (less water and less exempt compounds) by July 1, 2006 [paragraph (c)(2)].
- Reduce the VOC content limit for waterproofing concrete and masonry sealers to 100 grams per liter of coating (less water and less exempt compounds) by July 1, 2006 [paragraph (c)(2)].
- Three specific conditions added when the lower limit of a primer-sealer-undercoater, flat coating or non-flat coating does not apply [paragraph (c)(3)(B)].
- Expand the list of coating categories eligible under the Averaging Compliance Option [paragraph (c)(6)].
- Clarify that manufacturers who elect to comply with the Averaging Compliance Option to use only the sell through provision for each coating included in the program [paragraph (c)(6)(B)].

(d) Administrative Requirements

- Remove obsolete compliance effective dates [paragraph (d)(4)].

(e) Test Methods

No changes are proposed to this subdivision.

(f) Technology Assessment

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- Add varnishes to the list of coatings to be evaluated in a Technology Assessment by July 1, 2005.

(g) Exemptions

- Consolidate the list of coating categories, along with applicable conditions, currently required to be included in the annual report to the SCAQMD's Executive Officer reporting the number of gallons sold [paragraphs (d)(8)(A)-(E), paragraphs (g)(2), (g)(5), (g)(6) and (g)(9)].

- Move requirement that manufacturers of recycled coatings submit a letter to the SCAQMD's Executive Officer certifying their status as a Recycled Paint Manufacturer from "Exemptions" section of the rule to "Administrative Requirements" section of the rule [(paragraph (d)(10), paragraph (g)(5)].

- Move requirement for coating manufacturers selling containers having capacities of one quart or less to submit an annual report monitoring the use of the small container exemption [paragraph (g)(1)(A)] to "Administrative Requirements" section [paragraph (d)(8)(B)].

- Provide option to SCAQMD Governing Board to remove the exemption from the rule if using one quart or less of clear wood finishes, including varnishes, sanding sealers, lacquers and pigmented lacquers, after July 1, 2008 if from July 1, 2006 to June 30, 2008 clear wood varnishes and sanding sealers have a VOC content no greater than 450 grams per liter, and lacquers including pigmented lacquers have a VOC content no greater than 550 gram per liter [paragraph (g)(1)(A)(i) and (ii)]. Or

- Remove the exemption from the rule if using one quart or less of clear wood finishes, including varnishes, sanding sealers, lacquers and pigmented lacquers, after July 1, 2006 [paragraph (g)(1)(A)]

- Lower the VOC content limit for coatings containing acetone which is allowed to add up to ten percent by volume of VOC to avoid blushing of the finish [paragraph (g)(2)(B)].

- Roof coatings with a VOC content of 100 grams per liter or less that are certified under the USEPA Energy Star Program are not subject to the requirements of paragraph (c) from January 1, 2004 through December 31, 2006 [paragraph (g)(6)].

For a complete description of PAR 1113, the reader is referred to Appendix A of this Final EA.

ESTIMATED EMISSIONS REDUCTIONS

Implementation of PAR 1113 is currently estimated to result in approximately 3.73 tons per day of VOC emission reductions or approximately a 17 percent emission reduction of the 2010 baseline emission levels for this source category (24 tons per day), based on Annual Average Inventory in the 2003 AQMP (SCAQMD, August 2003) for this emission source category. The emission reductions from PAR 1113 are approximately 48 percent of the total emission reductions required by control measure CTS-07, as well as required by the settlement agreement. Table 1-2 summarizes the current proposed changes in VOC limits and the associated projected emission reductions.

TABLE 1-2

PAR 1113 Proposed Emission Limits and Projected Emission Reductions for Affected Coating Categories

Coating Category	Current Limit (g/l)[1]	Proposed Limit and Compliance Dates		Emission Reductions (tons/day)
		g/l[1]	Date	
Clear Wood Finishes (Varnishes)	350	275	7/1/06	0.22
Clear Wood Finishes (Sanding Sealers)	350	275	7/1/06	0.003
Clear Wood Finishes (Quart Exemption Removal)	---	275	7/1/06	0.83
Roof Coatings	250	50	1/1/05	1.59
Aluminum Roof Coatings	500	100	1/1/05	
Energy Star Roof Coatings	100	50	1/1/07	
Stains	250	100	7/1/07	0.56

TABLE 1-2 (CONCLUDED)

PAR 1113 Proposed Emission Limits and Projected
Emission Reductions for Affected Coating Categories

Coating Category	Current Limit (g/l)[1]	Proposed Limit and Compliance Dates		Emission Reductions (tons/day)
Waterproofing Sealers	250	100	7/1/06	0.52
Waterproofing Sealers (Concrete and Masonry)	400	100	7/1/06	
TOTAL Emissions Reductions (tons per day)				**3.73**

[1] Grams of VOC per liter of coating, less water and less exempt compounds.
[2] Limits are in grams of VOC per liter of material.

Table 1-3 summarizes the alternate option with regards to the removal of the quart size exemption for clear wood finishes to be presented to the SCAQMD Governing Board.

TABLE 1-3

Proposed Alternate Compliance Option for the
Removal of the Quart Size Exemption of Clear Wood Finishes

Quart Exemption Removal	Interim Limit (g/l) and Compliance Dates		Proposed Limit (g/l) and Compliance Dates		Emission Reductions (tons/day)
Clear Wood Varnishes and Sanding Sealers	450	7/1/06	275	7/1/08	0.83
Clear and Pigmented Lacquers	550	7/1/06	275	7/1/08	

CHAPTER 2

ENVIRONMENTAL CHECKLIST

INTRODUCTION

The environmental checklist provides a standard evaluation tool to identify a project's adverse environmental impacts. This checklist identifies and evaluates potential adverse environmental impacts that may be created by the PAR 1113 – Architectural Coatings.

GENERAL INFORMATION

Project Title:	Proposed Amended Rule 1113 – Architectural Coatings
Lead Agency Name:	South Coast Air Quality Management District
Lead Agency Address:	21865 Copley Drive Diamond Bar, CA 91765
CEQA Contact Person:	Michael A. Krause (909) 396-2706
Rule Contact Person:	Dan Russell (909) 396-2333
Project Sponsor's Name:	South Coast Air Quality Management District
Project Sponsor's Address:	21865 Copley Drive Diamond Bar, CA 91765
General Plan Designation:	Not applicable
Zoning:	Not applicable
Description of Project:	PAR 1113 would lower VOC content limit for the following coating categories: clear wood finishes, sanding sealers, waterproofing sealers, waterproofing concrete/masonry sealers, stains and roof coatings. The proposed amendments also phase-out the one-quart or less usage exemption for clear wood finishes and expand the scope of the Averaging Compliance Option to include the categories that are proposed for a change of VOC limits.
Surrounding Land Uses and Setting:	Not applicable
Other Public Agencies Whose Approval is Required:	Not applicable

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The following environmental impact areas have been assessed to determine their potential to be affected by the proposed project. None of the environmental topics are expected to be adversely affected by the proposed project. An explanation relative to the determination of impacts can be found following the checklist for each area.

¤	Aesthetics	¤	Geology and Soils	¤	Population/ Housing
¤	Agricultural Resources	¤	Hazards and Hazardous Materials	¤	Public Services
¤	Air Quality	¤	Hydrology and Water Resources	¤	Recreation
¤	Biological Resources	¤	Land Use and Planning	¤	Solid/Hazardous Waste
¤	Cultural Resources	¤	Mineral Resources	¤	Transportation/Circulation
¤	Energy	¤	Noise	¤	Mandatory Findings

DETERMINATION

On the basis of this initial evaluation:

I find the proposed project, in accordance with those findings made pursuant to CEQA Guideline §15252, COULD NOT have a significant effect on the environment, and that an ENVIRONMENTAL ASSESSMENT with no significant impacts will be prepared.

¤ I find that although the proposed project could have a significant effect on the environment, there will NOT be significant effects in this case because revisions in the project have been made by or agreed to by the project proponent. An ENVIRONMENTAL ASSESSMENT with no significant impacts will be prepared.

¤ I find that the proposed project MAY have a significant effect(s) on the environment, and an ENVIRONMENTAL ASSESSMENT will be prepared.

¤ I find that the proposed project MAY have a "potentially significant impact" on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL ASSESSMENT is required, but it must analyze only the effects that remain to be addressed.

¤ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier ENVIRONMENTAL ASSESSMENT pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL ASSESSMENT, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Date September 25, 2003 **Signature:** Steve Smith

Steve Smith, Ph.D.
Program Supervisor
Planning, Rule Development & Area Sources

ENVIRONMENTAL CHECKLIST AND DISCUSSION

		Potentially Significant Impact	Less Than Significant Impact	No Impact
I.	**AESTHETICS.** Would the project:			
a)	Have a substantial adverse effect on a scenic vista?	¤	¤	
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	¤	¤	
c)	Substantially degrade the existing visual character or quality of the site and its surroundings?	¤	¤	
d)	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	¤	¤	

I. a): The proposed amendments do not require any changes in the physical environment that would obstruct any scenic vistas or views of interest to the public. In addition, no major changes to existing architectural operations or stockpiling of additional materials or products outside of existing facilities are expected. The reason for this determination is that any physical changes would occur at existing industrial or commercial sites. Therefore, no significant impacts adversely affecting existing visual resources such as scenic views or vistas, etc. are anticipated to occur.

I. b), c): No new construction of buildings or other structures will result from the lowering of the VOC content in coatings so scenic resources will not be obstructed and the existing visual character of any site in the vicinity of affected operations will not be degraded. The purpose of AIM coatings is to improve the visual character and protect the surface of the product upon which the coating is applied. Defects in the appearance of the low-VOC coating after application, which could be argued as less aesthetically pleasing, is not anticipated because the rule contains a compliance schedule sufficient for coating formulators to produce acceptable quality low-VOC products that exhibit the desired performance characteristics. In addition, compliant low-VOC coatings are currently available, being sold, used and proven to be just as durable as coatings formulated with conventional solvents.

I. d): There are no components in PAR 1113 that would alter existing work practice, or require working at construction activities at night, and therefore, PAR 1113 is not expected to create a new source of substantial light or glare that would adversely affect day or nighttime views in an area.

Based on the above considerations, significant adverse impacts to aesthetics are not expected from PAR 1113. Since there are no significant adverse impacts, no mitigation measures are required.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
II. AGRICULTURE RESOURCES. Would the project:			
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	¤	¤	
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	¤	¤	
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	¤	¤	

II. a) - c): As previously discussed, no major construction is associated with the lowering of the VOC content of affected coating categories. Further, the coating activities would occur at existing industrial or commercial areas. Therefore, the proposed project would not result in any construction of new buildings or other structures that would convert farmland to non-agricultural use or conflict with zoning for agricultural use or a Williamson Act contract. Since the proposed project would not substantially change the equipment or process in which the coatings are applied, there are no provisions in the proposed amended rule that would affect land use plans, policies, or regulations. Land use and other planning considerations are determined by local governments and no land use or planning requirements will be altered by the proposed project.

Based on the above considerations, significant adverse impacts to agriculture resources are not expected from PAR 1113. Since there are no significant adverse impacts, no mitigation measures are required.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
III. AIR QUALITY. Would the project:			
a) Conflict with or obstruct implementation of the applicable air quality plan?	¤	¤	
b) Violate any air quality standard or contribute to an existing or projected air quality violation?	¤	¤	
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	¤	¤	
d) Expose sensitive receptors to substantial pollutant concentrations?	¤		¤
e) Create objectionable odors affecting a substantial number of people?	¤	¤	
f) Diminish an existing air quality rule or future compliance requirement resulting in a significant increase in air pollutant(s)?	¤	¤	

III. a): PAR 1113 would not conflict with or obstruct, air quality plan implementation but rather implement, in part, control measure CTS-07 from the 2003 AQMP, which was developed for the primary purpose of controlling emissions to attain and maintain all federal and state ambient air quality standards for the district. The 2003 AQMP concluded that major reductions in emissions of VOC and NOx are necessary to attain the air quality standards for ozone and PM10. VOC emissions cause the formation of ozone and PM10 (particulate matter less than 10 microns in size), two pollutants that exceed the state and national ambient air quality standards. VOCs react photochemically with oxides of nitrogen (NOx) to form ozone. Ozone is a strong oxidizer that irritates the human respiratory system and damages plant life and property. VOCs also react in the atmosphere to form PM10, a pollutant that adversely affects human health and limits visibility. Because these small particulates penetrate into the deepest regions of the lung, they affect pulmonary function and have even been linked to increased deaths. The VOC emissions from this industry will be reduced 3.73 tons per day as a result of implementing the proposed project thus providing a direct air quality benefit. This VOC emission reduction will assist the SCAQMD's progress in attaining and maintaining the ambient air quality standards for ozone.

III. b): For a discussion of this item, refer to the following analysis.

Air Quality Significance Criteria

To determine whether or not air quality impacts from adopting and implementing the proposed amendments are significant, impacts will be evaluated and compared to the following criteria. If impacts exceed any of the following criteria, they will be considered significant. All feasible mitigation measures will be identified and implemented to reduce significant impacts to the maximum extent feasible. The project will be considered to have significant adverse air quality impacts if any one of the thresholds in Table 2-1 are equaled or exceeded.

TABLE 2-1

Air Quality Significance Thresholds

Mass Daily Regional Thresholds		
Pollutant	**Construction**	**Operation**
NO_x	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM_{10}	150 lbs/day	150 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day

TAC, AHM, and Odor Thresholds	
Toxic Air Contaminants (TACs)	MICR $\geq$ 10 in 1 million HI $\geq$ 1.0 (project increment) HI $\geq$ 3.0 (facility-wide)
Accidental Release of Acutely Hazardous Materials (AHMs)	CAA §112(r) threshold quantities
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402
NO_2 1-hour average annual average	 500 ug/m^3 (= 25 pphm) 100 ug/m^3 (= 5.3 pphm)
PM_{10} 24-hour	 2.5 ug/m^3
Sulfate 24-hour average	 25 ug/m^3
CO 1-hour average 8-hour average	 1.1 mg/m^3 (= 1.0 ppm) 0.50 mg/m^3 (= 0.45 ppm)

KEY:
MICR = maximum individual cancer risk
ug/m^3 = microgram per cubic meter
mg/m^3 = milligram per cubic meter
AHM = acutely hazardous material
HI = Hazard Index
pphm = parts per hundred million
ppm = parts per million
TAC = toxic air contaminant

Construction Air Quality Impacts

The proposed project would only affect the future formulation of architectural coatings which is not expected to require physical changes or modifications involving construction activities. Thus, no construction air quality impacts will result from the proposed project.

Operational Air Quality Impacts – Direct Effects

The overall objective of the proposed project is to reduce VOC emissions from architectural coatings by lowering the VOC content limit from affected coating categories. To determine the VOC emission reductions anticipated for the proposed amendments, it is necessary to derive the emission inventory for architectural coatings. The following sections describe the methodology used to derive the emission inventory for architectural coatings and the VOC emission reductions anticipated for PAR 1113.

VOC Emissions Inventory

As mentioned in Chapter 1, CARB evaluated the data on architectural coatings sold in California collected with the latest survey conducted in 2003 (CARB Survey). To track the emission contributions of architectural coatings, an inventory was created that is based on the surveys. Coating sales in the SCAQMD are estimated based on population and represent 45 percent of those sold statewide. It is assumed that the distribution of waterborne and solvent-borne coatings is consistent throughout the state. The emission inventory is calculated by multiplying the sales volume by the sales weighted average actual-VOC content. Staff adjusted the baseline inventory to account for sales of: (a) coatings below the proposed VOC limit which were excluded from the inventory since these coatings are already compliant; (b) coatings above the current SCAQMD VOC limits assumed to be compliant and (c) small exempt containers except for clear wood coatings that are being phased out. This establishes an adjusted emission inventory in order to calculate the emission reductions for the proposed amendments. Table 1-1 lists the VOC emissions inventory for the affected coating categories as well as the amount of coatings used in the SCAQMD. Approximately 3 million gallons of affected coatings emit six tons per day of VOC.

VOC Emission Reductions

Implementation of PAR 1113 is currently estimated to result in approximately 3.73 tons per day of VOC emission reductions or approximately a 17 percent emission reduction of the 2010 emission levels for this source category (24 tons per day), based on Annual Average Inventory in the 2003 AQMP (August 2003, SCAQMD) for this emission source category. Table 1-2 summarizes the current proposed changes in VOC limits and the associated projected emission reductions.

III. c): Cumulative air quality impacts from the proposed amendments, PAR 1171, previous amendments and all other AQMP control measures considered together are not expected to be significant because implementation of all AQMP control measures is expected to result in net emission reductions and overall air quality improvement. This determination is consistent with the conclusion in the 2003 AQMP PEIR that cumulative air quality impacts from all AQMP control measures are not expected to be significant (SCAQMD, 2003). Indeed, air quality modeling performed for the 2003 AQMP indicated that the district would achieve all federal ambient air quality standards by the year 2010 (SCAQMD, 2003). Future VOC control measures will assist in achieving the goal of ozone attainment by 2010. Based on regional modeling analyses performed for the 2003 AQMP, implementing control measures contained in the 2003 AQMP, in addition to the air quality benefits of the existing rules, it is anticipated to bring the district into attainment with all national and most state ambient air quality standards by the year 2010. Therefore, there will be no cumulative adverse air quality impacts from implementing PAR 1113. There are no provisions of PAR 1113 that result in either project-specific or cumulative air quality impacts. Since the proposed project is not expected to create significant adverse project-specific air quality impacts, indeed it is expected to improve air quality, the proposed project's contribution to significant adverse cumulative impacts are less than cumulatively considerable (CEQA Guidelines §15130(a)(3)) and, therefore, are not significant.

III. d): PAR 1113 is not expected to create significant adverse human health impacts or expose sensitive receptors to substantial pollutant concentrations based on the following analysis of the compounds to be used in reformulating new compliant coatings compared to the solvents currently formulated in conventional coatings.

Coalescing solvents such as propylene glycol and ethylene glycol, may be used more widely in low-VOC water-borne formulations as alternatives to their more toxic counterparts such as toluene, xylene, ethylene glycol monoethyl ether (EGEE), and ethylene glycol monomethyl ether (EGME). Coalescing solvents act as plasticizers in certain coating formulations to allow the otherwise solid resin to flow together to form a film. Isocyanates may be used as condensation reaction agents in low-VOC two-component waterborne urethane systems for clear wood finishes. Monomer styrene may be used as a viscosity reducer in high-solid clear wood finishes, however, these are also currently being used in conventional coatings. Isopropyl alcohol and ethylene glycol monobutyl ether (EGBE) are also formulated in both conventional and reformulated compliant coatings.

Conventional Solvents

Toluene

Toluene is a colorless liquid whose largest use is in the production of benzene. Toluene is also used as an octane booster or enhancer in gasoline, as a raw material for toluene diisocyanate, as a solvent, and in solvent extraction processes. As a solvent, it may be used in aerosol spray paints, wall paints, lacquers, inks, adhesives, natural gums, and resins, as well as in a number of consumer products, such as spot removers, paint strippers, cosmetics, perfumes, and antifreezes.

Breathing large amounts of toluene for short periods of time adversely affects the human nervous system, the kidneys, liver, heart, eyes, respiratory and reproductive/developmental (hazard index targets). Effects range from unsteadiness and tingling in fingers and toes to unconsciousness and death. Direct, prolonged contact with toluene liquid or vapor irritates the skin, eyes and nose. Human health effects associated with breathing or otherwise consuming smaller amounts of toluene over long periods of time are not known. Repeatedly breathing large amounts of toluene, such as when "sniffing" glue or paint, can cause dizziness, headaches and permanent brain damage. As a result, humans can develop problems with speech, hearing, and vision. Humans can also experience loss of muscle control, loss of memory, and decreased mental ability. Exposure to toluene can also adversely affect the kidneys. Laboratory animal studies and, in some cases, human exposure studies show that repeat exposure to large amounts of toluene during pregnancy can adversely affect the developing fetus. Other studies show that repeat exposure to large amounts of toluene adversely affects the nervous system, the kidneys, and the liver of animals.

The Clean Air Act Amendments of 1990 list toluene as a hazardous air pollutant. Toluene is also listed in Table I of SCAQMD Rule 1401 – New Source Review of Toxic Air Contaminants.

Xylene

Xylene is a colorless liquid that occurs naturally in petroleum and coal tar and is formed during forest fires. Chemical industries produce xylene from petroleum. It is one of the top 30 chemicals produced in the United States in terms of volume. As nonexplosive aromative hydrocarbons, mixtures of the three (technical xylene) isomers are heavily used in the chemical industry and in the petroleum industry as a gasoline “antiknock” additive. Xylene is also used as a solvent and in the printing, rubber, and leather industries. Furthermore, it is used as a cleaning agent, paint thinner, and in paints and varnishes. It is found in small amounts in airplane fuel and gasoline.

Xylene adversely affects the brain. High levels of exposure for short periods (14 days or less) or long periods (more than one year) can cause headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance. Exposure of persons to high levels of xylene for short periods can also cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; problems with the lungs; delayed reaction time; memory difficulties; stomach discomfort; and possibly changes in the liver and kidneys. It can cause unconsciousness and even death at very high levels.

Studies of unborn animals indicate that high concentrations of xylene may cause increased numbers of deaths, and delayed growth and development. In many instances, these same concentrations also cause damage to the mothers. It is unknown if xylene harms the unborn child if the mother is exposed to low levels of xylene during pregnancy.

The International Agency for Research on Cancer (IARC) has determined that xylene is not classifiable as to its carcinogenicity in humans. Human and animal studies have not shown xylene to be carcinogenic, but these studies are not conclusive and do not provide enough information to conclude that xylene does not cause cancer.

The Clean Air Act Amendments of 1990 list xylene as a hazardous air pollutant. Because xylene can cause adverse health affects other than cancer, it is listed in Table I of Rule 1401.

Methyl Ethyl Ketone

The primary use of methyl ethyl ketone, accounting for approximately 63 percent of all use, is as a solvent in protective coatings. It is also used as a solvent in printing inks, paint removers, and other cleaning products; in the production of magnetic tapes; and in dewaxing lubricating oil. Methyl ethyl ketone is used as a chemical intermediate in several reactions, including condensation; halogenation; ammonolysis; and oxidation. Small amounts of methyl ethyl ketone are also used as a sterilizer for surgical instruments, hypodermic needles, syringes, and dental instruments; as an extraction solvent for hardwood pulping and vegetable oil; and as a solvent in pharmaceutical and cosmetic production.

Breathing MEK for short periods of time, such as when painting in a poorly vented area, can adversely affect the nervous system. Effects range from headaches, dizziness, nausea, and numbness in fingers and toes to unconsciousness. MEK vapor irritates the eyes, the nose, and the throat. Direct, prolonged contact with liquid methyl ethyl ketone irritates the skin and damages the eyes. Human health effects associated with breathing or otherwise consuming smaller amounts of methyl ethyl ketone over long periods of time are not known. Workers have developed dermatitis, upset stomachs, loss of appetite, headaches, dizziness, and weakness as a result of repeated exposure to MEK. Laboratory studies show that exposure to large amounts of MEK in air causes animals to give birth to smaller offspring. Studies also show that repeat exposure to large amounts of MEK in air causes adverse liver and kidney effects in animals. The 1990 Clean Air Act Amendments list methyl ethyl ketone as a hazardous air pollutant.

Ethylene Glycol Ethers (EGEE, EGME)

Ethylene glycol ethers are colorless transparent liquids. EGEE and EGME are ethylene glycol ethers with alkyl chains of one or two carbon atoms. EGEE is also known as cellusolve and is a widely used solvent for nitrocellulose, dyes, inks, resins, lacquers, paints, varnishes. It is also a component of many cleaning agents, epoxy coatings, paints, hydraulic fluid, and is an anit-icing fuel additive in aviation. EGME is used as a solvent for cellulose acetate and resins as well as a solvent in the semiconductor industry. It is also used in dyeing leather and in the manufacture of photographic film. EGME is used as an anti-freeze in jet fuels. Quick drying varnishes, enamels, nail polishes, and wood stains may also contain EGME. EGEE and EGME are federal hazardous air pollutants (HAPs) and were identified as toxic air contaminants (TACs) in California in April

1993 under AB 2728. Exposures to glycol ethers are not well characterized, but may occur near sources of industrial emissions.

There is evidence in both humans and animals that exposure to specific glycol ethers can result in developmental toxicity. Developmental toxicity is one of the endpoints of concern for impacts on infants and children. The developing fetus is susceptible to certain glycol ethers and appears to be susceptible at levels lower than those associated with maternity toxicity. The effects of EGEE and EGME are considered severe because they include teratogenicity, testicular toxicity, and fetotoxicity in rabbits.

The glycol ethers cause damage to the developing fetus at exposure levels below those that cause maternal toxicity. Toxicity to the bone marrow and thymus at higher doses in adult animals indicate the possibility of enhanced risk to developing hematopoietic and immune systems. In some key animal studies, exposure to EGEE induces malformations in offspring in the absence of significant maternal toxicity while EGME is fetotoxic and teratogenic at concentrations below that necessary to induce maternal toxicity. EGME may cause changes in brain chemistry when exposure occurs during development. The brains of 21-day-old offspring had neurochemical changes, especially in the brainstem and cerebrum. They showed no behavioral effects as indicated by neuromotor function, activity, and simple learning ability.

The acute REL for EGEE is based on specific skeletal defects, including delayed ossification of the cervical vertebrae, sternum, and extra ribs seen in the fetuses from pregnant rats exposed by inhalation six hours per day on days six to fifteen of gestation. The chronic REL for EGEE is based on testicular degeneration and decreased hemoglobin in rabbits. The acute REL for EGME is based on teratogenic effects in rabbits and the chronic REL for EGME is based on testicular toxicity (reproductive system) in rabbits.

The most sensitive toxic endpoints associated with EGEE, EGME are developmental toxicity and male reproductive toxicity. These glycol ethers appear to be more toxic to the developing human than to humans at later stages of life. However, based on current risk assessment methodology, the existing health criteria for glycol ethers should be adequately protective of children because they are based on developmental endpoints in animals.

Possible Solvent Replacements

Propylene Glycol Monomethyl Ether

Propylene glycol monomethyl ether (PGME) is a colorless liquid whch has critical liver effects in rats and the hazard index target is the alimentary system (liver). Propylene glycol is used as a solvent for cellulose, acrylics, dyes inks and stains. Thus, the primary use of PGME is in lacquers and paints. Toxicity of propylene glycol ether is lower than ethylene glycol ether, and thus, it can be regarded as relatively innocuous or low toxic. It can be used as or for chemical intermediate, brake liquid, detergent, frost resistant solvent as well as solvent for high grade paint. Use of PGME is anticipated to increase due to its low systemic toxicity.

No reports or studies of human toxicity following chronic expsosure to PGME were located in the literature. Slight eye irritation was reported by two of six human volunteers exposed to 100 ppm PGME for 2 hours. These subjects were exposed for a total of three and a half hours during which no decrement in visual acuity, coordinatoion, neurological responses or reaction time measured.

As mentioned in the previous subsection, EGME, a structurally related compound to PGME, exerts considerable toxicity on the blood, thymus, testes, and developing fetus. The toxicity of EGME has been linked to its primary metabolite, methoxyacetic acid. Recent comparative toxicity and metabolism studies indicate that the relatively low systemic toxicity exerted by PGME is due to its different metabolites.

Ethylene Glycol

Ethylene glycols are clear, colorless, odorless liquids that are used as an antifreeze agent in cooling and heating systems; in hydraulic brake systems; as an ingredient in electrolytic condensers; as a solvent in the paints and plastic industries; and in inks for ball-point pens and printer's ink. It is used in the manufacture of some synthetic fibers and in synthetic waxes. In addition, ethylene glycols have been used in some skin lotions, flavoring essences, in asphalt emulsion plants, in wood stains and adhesives, in leather dyeing as well as a de-icing fluid for airport runways.

The chronic effect from ethylene glycol is respiratory irritation to human volunteers and the harzard index target is the respiratory system, kidney and teratogenicity. Ten motor servicing workers had significantly higher urinary levels of ethylene glycol and ammonia, and decreased urinary glycosaminoglycan levels. The ethylene glycol levels in the air were undetectable in the worker's breathing zones, therefore dermal absorption appeared to be the primary route of exposure.

In a study of 20 volunteer male prisoners in Alabama, 20 hours per day exposure to aerosolized ethylene glycol concentration varying up to a mean of 20 ppm for 30 days was without effect. Respiratory irritation was noted after 15 minutes at an exposure concentration of 75 ppm and became quickly intolerable at 123 ppm. No effects were observed in normal clinical chemistry, clinical serum enzyme levels for liver and kidney toxicity, hematotoxicity or psychologoical responses. The respiratory irritation at 75 ppm resolved soon after exposure with no long term effects noted after a six-week follow up period.

Isopropyl Alcohol

Isopropyl alchol (IPA) is a colorless liquid soluble in benzene, miscible with most organic solvents, and slightly soluble in water, alcohol and acetone. IPA has wide use in consumer products such as mild skin disinfectants and astringents, and is also used as a solvent for cellulose nitrate. Irritation of the mucous membranes of the upper respiratory tract may occur following inhalation of isopropyl alcohol. In one study, ten human subjects were exposed for two to five minutes to 400 or 800 ppm isopropyl alcohol. Exposure to 400 ppm isopropyl alcohol produced mild irritation of the eyes, nose, and throat. When exposed to 800 ppm the majority of the subjects declared the atmosphere unsuitable for a prolonged exposure. The subjects indicated, however, that prolonged exposure to 200 ppm would not be objectionable. Persons with eye, skin, respiratory or neurological conditions and diabetics may be more sensitive to the toxic effects of isopropyl alcohol. Individuals exposed to acetone, carbon tetrachloride, or n-hexane may be at increased risk for adverse effects when exposed simultaneously to isopropyl alcohol. No human reproductive studies are currently available and only a limited number of animal studies on the effects of isopropyl alcohol have been conducted.

Ethylene Glycol Monobutyl Ether (EGBE)

EGBE, otherwise known as butyl cellosolve, is a colorless liquid that is used as a coupling agent to stabilize immiscible ingredients in metal cleaners, textile lubricants, and cutting oils. It is also used as a solvent for nitrocellulose resins, spray lacquers, enamels, and varnish removers. EGBE is also found in hydraulic fluids. EGBE has acute effects of irritation and the respiratory system is the hazard index target.

Two adult male volunteers were exposed to 113 ppm of EGBE for four hours. Eye, nose and throat irritation, taste disturbances, and headache and nausea were reported. Symptoms observed included nasal and ocular irritation, disagreeable metallic taste, and a slight increase in nasal mucus discharge. Four additional volunteers were exposed either mouth-only or skin-only, by a mouthpiece or a respirator in a chamber, to 50 ppm EGBE for two hours. Capillary blood samples were taken at regular intervals to determine rate of uptake from dermal and inhalation exposure. The experiment concluded that dermal uptake of EGBE from air is approximately four times greater than respiratory uptake. Seven healthy male adults were exposed to 20 ppm of EGBE in a chamber experiment designed to assess pulmonary uptake and metabolism of EGBE. Butoxyacetic acid was the primary metabolite found in the urine. The authors report that 57 percent of the inhaled dose was absorbed in the respiratory tract. In addition, persons with preexisting neurologist, blood or kidney conditions might be more sensitive. No studies on the developmental and reproductive toxicity of EGBE in humans were located.

Toluene Diisocyanates (TDI)

Toluene diisocyanates (TDI) are a colorless to pale yellow liquid which have a chronic effect of decreased lung function in occupationally exposed workers and the hazard index target is the respiratory system. TDI are miscible with ether, acetone, benzene, carbon tetrachloride, chlorobenzene, diglycol monomethyl ether, kerosene, olive oil, alcohol; soluble in ethyl acetate

Commercial toluene diisocyanate is comprised of approximately 80 percent 2,4-TDI and 20 percent 2,6-TDI. TDI is used in the manufacture of polyurethane foams, elastomers, and coatings. It is also used in the manufacture of floor and wood finishes, lacquers, foam plastics, polyurethane foam coated fabrics, and insulation materials. Emissions of TDI to the atmosphere can occur during production, handling, and processing of polyurethane foam and coatings. No relationship between TDI exposure and change in lung function was observed, although the prevalence of chronic bronchitis was significantly associated with exposure. The limitations of studies showing pulmonary effects of TDI exposure include use of area sampling vs. breathing-zone measurement of exposure, poor statement of criteria for evaluating hypersensitivity, and the presence of other compounds in the environment which may influence lung function. The major limitations of the study are the uncertainty in estimating exposure, the potential variability in exposure concentration, and the limited nature of the study that focused on lung effects.

Methylene Diphenyl Isocyanate (MDI)

Methylene diphenyl isocyanate (MDI) are light yellow and used for bonding rubber to nylon. MDI is also used in the manufacture of lacquer coatings and in the production of polyurethane resins and spandex fibers. It is often handled in a partially polymerized form, which has a much lower vapor pressure than the monomer. They are soluble in acetone, benzene, kerosene, and nitrobenzene (monomer). The chronic effect is hyperplasia of the olfactory epithelium in rats and the hazard index target is the respiratory system.

A five-year occupational study of 107 workers from a polyurethane plastic manufacturing plant examined pulmonary function, respiratory systems, and smoking habits. No significant changes in pulmonary function or respiratory systems were observed when controlled for smoking.

Styrene

Styrene is a flammable, volatile liquid with a penetrating odor. Low levels of styrene occur in some foods, probably as a result of microbial action, and small amounts are permitted for flavoring purposes. The major source of styrene is industrial synthesis. Styrene is used in the production of polystyrene plastics and resins from which are manufactured many industrial and consumer products (e.g., luggage, construction and packaging materials, tub/shower units and boats).

Human exposure to styrene occurs under occupational and environmental conditions. OSHA estimates about 90,000 workers are exposed to styrene. Environmental exposure occurs during the release of styrene during transportation, manufacture and storage activities, during human activities such as smoking cigarettes or breathing automobile exhaust, and during the use of consumer products. Exposure to styrene by inhalation is also possible during its evaporation from water. In California, no styrene was detected in surface water discharges in 1998 from facilities that report under the Toxics Release Inventory program, although nationwide, surface water discharges of about 13,000 pounds of styrene were reported to the U.S. EPA.

Eye and throat irritation have also been observed among acutely exposed humans. Acute exposures of laboratory animals to styrene can cause irritation and central nervous system decrements. Exposure of mice to styrene by inhalation resulted in liver damage. Multiple administrations of styrene to mice resulted in suppressed antibody and enhanced hypersensitivity responses. Subchronic inhalation exposures of mice resulted in lesions in the lung olfactory epithelium, forestomach and adrenal gland. Mice exposed for two years by inhalation to styrene exhibited liver necrosis, respiratory tract lesions and reduced body weight gain. Rats subchronically exposed to styrene exhibited alterations in the astroglial filaments and lesions of the respiratory tract. Mice exposed for two years by inhalation to styrene developed bronchiolar-alveolar adenoma and carcinoma. In one strain of mice that received styrene by gavage for the first 16 weeks of life, there was an increased incidence of lung tumors, whereas in a different strain of mice that received styrene by gavage for 120 weeks from birth, no tumors were observed.

Operational Air Quality Impacts – Toxic Effects

To analyze in more detail the toxic effects associated with the use of compliant low-VOC coatings, the SCAQMD conducted a health risk assessment (HRA) for the compounds listed in Tables 2-2 to 2-5 consistent with the HRA procedures listed in the SCAQMD's <u>Risk Assessment Procedures for Rules 1401 and 212</u> document. An HRA is used to estimate the likelihood of an individual contracting cancer or experience other adverse health effects as a result of exposure to toxic air contaminants (TACs). Risk assessment is a methodology for estimating the probability or likelihood of an adverse health effect occurrence.

Carcinogenic Effects

Risks from carcinogens are expressed as an added lifetime risk of contracting cancer as a result of a given exposure. For example, if the emissions from a facility are estimated to produce a risk of one in one million (1×10^{-6}) to the most exposed individual, this means that the individual's chance of contracting cancer has been increased by one chance in one million over and above his or her chance of contracting cancer from all other factors (for example, diet, smoking, heredity and other factors). This added risk to a maximally exposed individual is referred to as a "maximum individual cancer risk" or MICR. For CEQA purposes, the SCAQMD's significance threshold for carcinogenic impacts is a MICR greater than or equal to 10 in one million (10×10^{-6}).

Although Appendix B contains a variety of clear wood coatings, including numerous single-component formulations and two-component systems, discussions with coatings manufacturers and review of coating product sheets indicate that isocyanates may be used in some low- or zero-VOC, water-borne compliant two-component urethane coating systems for clear wood finishes. TDI is the only compound potentially used in the reformulated coatings that has a carcinogenic unit risk factor according to the SCAQMD's Rule 1401. TDI is part of a group of compounds known as diisocyanates, which are low-molecular-weight aromatic and aliphatic compounds. Also included in this group, but not considered to be carcinogenic, are hexamethylene diisocyanates (HDI) and methylene bisphenyl diisocyanates (MDI). These water-borne compliant formulations are intended as direct replacements for their higher-VOC solvent-borne two component counterparts currently being applied.

To analyze the potential cancer risks associated with the use of compliant coatings containing TDI to downwind receptors and applicators of these coatings, the SCAQMD performed a HRA. Typical formulations when atomized using a spray gun emit approximately one percent (by weight) of the TDI in the two component system, although most low- to zero-VOC systems should not result in any volatilization of any VOC compounds, including TDI, due to the small volume. The results of the carcinogenic HRA for TDI are shown in Table 2-2. Table 2-2 shows the volume of TDI coatings in gallons per day that would result in a MICR of 10 in one million (10×10^{-6}) or greater for sensitive receptors at specified distances.

TABLE 2-2

TDI Coatings in Gallons Per Day That Would Exceed A MICR Of 10×10^{-6}

	Downwind Receptor Distances, (in meters)					
	25		**50**		**100**	
Compound	**Emissions** lbs/day	**Usage** gals/day	**Emissions** lbs/day	**Usage** gals/day	**Emissions** lbs/day	**Usage** gals/day
TDI	0.14	1.52	0.41	4.60	1.55	17.23

As shown in Table 2-2, less than two gallons per day of coatings containing TDI can be used before the significance threshold of a MICR $>10 \times 10^{-6}$ is exceeded at a downwind receptor distance of 25 meters. At more distant source receptor distances the amount of daily coatings that can be used before exceeding the SCAQMD's significance threshold increases.

Although the daily usage levels in Table 2-2 are low, the application of architectural coatings is not expected to be an on-going operation at a specific site. The coating application is taking place at various locations exposing different sensitive receptors for periods of time much shorter than the exposure time estimated in the formulation of the unit risk factor for a specific TAC. Therefore, significant adverse carcinogenic human health impacts are not expected for downwind residential or sensitive receptors because the HRA estimates the probability of a potential maximally exposed individual contracting cancer as a result of continuous exposure to toxic air contaminants over a period of 70 years for residential and 46 years for worker receptor locations. Furthermore, the application of these coating systems are typically used for maintenance (e.g., touch-up and repair) or repaint purposes, lasting only a couple days to weeks, and occurring on an intermittent basis (e.g., once every couple of years to every ten years, or more). Therefore, downwind residential or sensitive receptors will not be exposed on a long-term basis to TDI that would result in significant adverse carcinogenic human health impacts. The coating categories affected by the current amendments do not include IM coatings.

Furthermore, it appears that TDI in compliant water-borne two component systems are being phased out and replaced with HDI and MDI. Since HDI and MDI are noncarcinogenic, the replacement of TDI with HDI and MDI would eliminate all carcinogenic risk associated with the use of these compliant coatings.

In the context of worker exposure (e.g., applicators of the coatings), significant adverse impacts are not expected. Safety measures to protect individuals against exposure to diisocyanates are described in the following paragraphs.

Worker Isolation – Areas where coatings with diisocyanates are applied should be restricted to essential workers. If feasible, these workers should avoid direct contact with diisocyanates by using automated equipment or area with plenty of ventilation.

Protective Clothing and Equipment – When there is potential for diisocyanate exposure, workers should be provided with and required to use appropriate personal protective clothing and equipment such as coveralls, footwear, chemical-resistant gloves and goggles, full faceshields, and suitable respiratory equipment.

Respiratory Protection – Only the most protective respirators should be used for situations involving exposures to diisocyanates because they have poor warning properties, are potent sensitizers, or may be carcinogenic. These respirators include:

Any respiratory protection program must, at a minimum, meet the requirements of the OSHA respiratory protection standard [29 CFR 1910.134]. Respirators must be certified by NIOSH and MSHA according to 30 CFR or by NIOSH (effective July 19, 1995) according to 42 CFR 84. A complete respiratory protection program should include: (1) regular training and medical evaluation of personnel, (2) fit testing, (3) periodic environmental monitoring, (4) periodic maintenance, inspection, and cleaning of equipment, (5) proper storage of equipment, and (6) written standard operating procedures governing the selection and use of respirators. The program should be evaluated regularly. The following publications contain additional information about selection, fit testing, use, storage, and cleaning of respiratory equipment: NIOSH Guide to Industrial Respiratory Protection [NIOSH 1987a] and NIOSH Respiratory Design Logic [NIOSH 1987b]. Examples of complying with these regulations include the following:

- Any self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode, and

- Any supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

Worker and Employer Education – Worker education is vital to a good occupational safety and health program. OSHA requires that workers be informed about:

- Materials that may contain or be contaminated with diisocyanates;
- The nature of the potential hazard [29 CFR 1910.1200]. Employers must transmit this information through container labeling, MSDSs, and worker training;
- The serious health effects that may result from diisocyanate exposures; and
- Any materials that may contain or be contaminated with diisocyanates.

Additionally, workers should take the following steps to protect themselves from diisocyanate exposure:

- Be aware that the highest diisocyanate concentrations may occur inside containment structures.
- Wash hands and face before eating, drinking, or smoking outside the work area.
- Participate in medical monitoring and examination programs, air monitoring programs, or training programs, offered by your employer.

The above safety practices and application techniques are recommended by the National Association of Corrosion Engineers (NACE) and the Society for Protective Coatings during the application of architectural coatings including future compliant two-component low-VOC TDI coatings. Thus, applicators will not require additional training regarding the proper handling or application of compliant coatings containing diisocyanates. This will further reduce the applicator's exposure to diisocyanates.

Non-Cancer Health Effects

There are a range of potential adverse health effects associated with toxic substances currently formulated in AIM coatings as noted in Table 2-3. The actual effects of exposure to coatings, however, depend on such factors as the exposure duration, potency of the solvents of concern, exposure frequency, and other factors.

TABLE 2-3

Toxicity of Currently Available Coating Solvents

Traditional/Conventional Solvents				
Solvents	**TLV (ACGIH)[a] (ppm)**	**PEL (OSHA)[a] (ppm)**	**IDLH (NIOSH) (ppm)**	**Health Hazard**
Conventional Solvents				
Toluene	50	200	2,000	Moderate irritation - eye, nose, throat; narcosis: skin; suspect teratogen; mutagen, nervous system
Xylene	100	100	1,000	Mild irritation - eye, nose, throat; narcosis; skin
MEK	200	200	3,000	Mild irritation - eye, nose, throat; narcosis
Butyl Acetate	150	150	10,000	Moderate irritation - eye, nose, throat; narcosis
Isobutyl Alcohol	50	100	8,000	Mild irritation - eye, nose, throat; suspect carcinogen
Stoddard Solvent	100	500	5,000	Narcosis; mild irritant
Petroleum Distillates (Naptha)	100	500	10,000	Mild irritation; narcosis
EGME	5	25	Not Available	Cumulative CNS; skin; suspect reproductive effects; blood disorders
EGEE	5	200	Not Available	Cumulative blood damage; moderate irritation of eyes, throat, skin
Replacement Solvents				
Propylene Glycol	100	100	Unknown	Mild irritation – slight eye, anesthesia
Ethylene Glycol	Not Available	10	2,500	Mild irritation - respiratory, skin, kidney, reproductive
EGBE	20	50	700	Mild irritation - eye, nose, throat; anemia; skin
Isopropyl Alcohol	400	400	12,000	Mild irritation - eye, nose, throat; narcosis
TDI	0.005	0.02	10	Mild irritation - respiratory
MDI	0.005	0.02	40	Mild irritation - respiratory
Styrene	20	100	5,000	Mild irritation – eye, respiratory, neurotoxicity

[a] Source: American Conference of Government Industrial Hygienists, 2001

[b] Source: Occupational Safety and Health Administration

[c] IDLH = immediately dangerous to life and health

To evaluate noncancer health effects from a TAC, exposure levels are estimated (just as with carcinogens), so that they can be compared to a corresponding reference exposure level (REL). As for carcinogens, exposure is evaluated for the most exposed individual. Chronic exposures are evaluated using the same exposure assumptions described for carcinogens -- continuously for a 70-year residential lifetime or 8 to 9 hours per day and 50 weeks a year for a 46-year working (commercial or industrial) lifetime. For acute exposures, the maximum hourly airborne concentration of a TAC is estimated.

The health risk from exposure to a noncarcinogenic TAC is evaluated by comparing the estimated level of an sensitive receptor's exposure to the TAC to the TAC's REL. The ratio is expressed as a hazard index (HI), which is the ratio of the estimated exposure level to the REL:

$$\text{Hazard Index (HI)} = \frac{\text{Estimated Exposure Level}}{\text{Reference Exposure Level}}$$

A HI of one or less indicates that the estimated exposure level does not exceed the Reference Exposure Level, and that no adverse health effects are expected. For CEQA purposes, the SCAQMD's significance threshold for noncarcinogenic impacts is a hazard index greater than or equal to one.

The ratio of the estimated acute level of sensitive receptor's exposure to a TAC to the acute REL is called an acute HI. The ratio of the estimated chronic level of exposure to a TAC to its chronic REL is called a chronic hazard index.

Based on the foregoing HRA methodologies, the SCAQMD estimated the long-term chronic, and short-term acute risks associated with the use of compounds where toxicity data were available. Tables 2-2 through 2-3 highlight the results of this risk analysis. These tables present the amount of each compound that can be emitted and coating usage before the SCAQMD significance thresholds are exceeded. For a more detailed discussion of how the table values where derived and the unit risk factors, chronic RELs, and acute RELs used to conduct the HRAs, the reader is referred to Appendix C of this Final EA.

Chronic Exposure: Table 2-4 shows the number of gallons it would take on a daily basis to equal or exceed a chronic hazard index of 1.0. According to industry sources, no more than 25 to 30 gallons of AIM coatings can be applied per day. If a solvent listed in Table 2-4 can exceed the significance threshold with a usage of less than 25 gallons daily, then the chronic HI for that compound is potentially significant. Since no more than 25 to 30 gallons of any given coating can be applied in one day, then solvents which require more than 25 gallons to exceed the daily significance threshold are not likely to have a significantly adverse chronic impact. As shown in Table 2-4, two conventional solvents currently have potentially significant chronic health impact while one compound, TDI, has the potential to exceed the significance threshold for chronic impacts. As evaluated in the previous section, TDIs, are used as reaction agents in two-component urethane systems which are not conducive to architectural coating application because of the limited pot life and the complexity of the two-part system. Thus, the two-component urethanes for clear wood finish applications are not widely used and are not expected to be widely used to comply with the proposed amendments.

TABLE 2-4

Long-term Chronic Exposure Risk Assessment
(Gallons Per Day That Would Exceed A Chronic Hazard Index Of 1.0)

	Downwind Receptor Distances					
	25m		50m		100m	
Conventional Solvents	**Emissions** lbs/day	**Usage** gals/day	**Emissions** lbs/day	**Usage** gals/day	**Emissions** lbs/day	**Usage** gals/day
Toluene	45.09	50.10	136.71	151.90	511.68	568.54
Xylene	105.21	116.90	318.99	354.44	1193.93	1326.59
EGEE	10.52	11.69	31.90	35.44	119.39	132.66
EGME	9.02	10.02	27.34	30.38	102.34	113.71
Replacement Solvents						
Ethylene Glycol	60.12	111.33	182.28	337.56	682.24	1263.42
Propylene Glycol	1052.09	2337.99	3189.94	7088.75	11939.28	26531.73
Isopropyl Alcohol	1052.09	2922.48	3189.94	8860.94	11939.28	33164.67
TDI	0.01	0.12	0.03	0.35	0.12	1.33
Methylene Phenyl Diisocyanate (MDI)	0.11	1.17	0.32	3.54	1.19	13.27
Styrene	135.27	1502.99	410.13	4557.05	1535.05	17056.11

Like risks associated with carcinogens, risks associated with compounds that pose chronic hazard risk are based on long-term continuous exposure. AIM coatings are applied on an infrequent and intermittent basis. For first time painting or repainting situations, application of AIM coatings occurs over a relatively short period of time, over the course of hours up to several weeks depending on the specific nature of the job. For touch-up and maintenance applications, actual application of AIM coatings takes several hours up to several weeks to complete depending on the specific nature of the job and occurs periodically through-out the year or over the course of several years. Therefore, because of the intermittent and infrequent application of AIM coatings, long-term exposure of downwind residential or sensitive receptors to chronic health effects is not anticipated from the implementation of PAR 1113. There are reformulations using propylene glycol which demonstrates adverse chronic impacts but at lower levels than EGEE or EGME. It is anticipated these less toxic coalescing solvents will be used to formulate future compliant low-VOC coatings. To a certain extent, PAR 1113 may have the beneficial effect of encouraging or accelerating the trend of formulating AIM coatings with less toxic or nontoxic solvents.

Acute Exposure: Several of the solvents used in conventional coatings that were analyzed for chronic affects have also been analyzed for short-term acute worker health effects through short-term, high-level or "acute" exposure. Table 2-5 presents the results of the SCAQMD’s acute HRA for the solvents used in conventional coatings.

As shown in Table 2-5, low usage conventional coatings formulated with EGEE, or EGME could trigger acute human health impacts. Since there are many different product manufacturers and coating formulations, as well as many different coating applications, the specific chemical composition of reformulated coating products is not known. However, as noted in earlier in this chapter, there is currently a trend by resin manufacturers and coating formulators of replacing currently applied coatings containing EGEE, and EGME with less toxic coalescing solvents such as ethylene glycol, and propylene glycol. There are reformulations using EGBE which demonstrates adverse acute impacts but at lower levels than EGEE or EGME. It is anticipated these less toxic coalescing solvents will be used to formulate future compliant low-VOC coatings. To a certain extent, PAR 1113 may have the beneficial effect of encouraging or accelerating the trend of formulating AIM coatings with less toxic or nontoxic solvents. Therefore, the implementation of PAR 1113 may ultimately provide human health benefits.

TABLE 2-5

Short-term Acute Exposure Risk Assessment

(Gallons Per Day That Would Exceed An Acute Hazard Index Of 1.0)

	Downwind Receptor Distances					
	25m		**50m**		**100m**	
Conventional Solvents	**Emissions** lbs/hr	**Usage** gals/day	**Emissions** lbs/hr	**Usage** gals/day	**Emissions** lbs/hr	**Usage** gals/day
Toluene	18.50	20.56	36.98	41.09	99.06	110.07
Xylene	1.10	1.22	2.20	2.44	5.89	6.54
EGEE	0.19	0.21	0.37	0.41	0.99	1.10
EGME	0.05	0.05	0.09	0.10	0.25	0.28
Methyl Ethyl Ketone (MEK)	6.50	7.22	12.99	14.44	34.81	38.67
Replacement Solvents						
EGBE	7.00	15.56	13.99	31.09	37.48	83.30
Isopropyl Alcohol	1.60	4.44	3.20	8.88	8.57	23.80
Styrene	10.50	116.67	20.99	233.19	56.22	624.72

Chronic and acute exposure of coating applicators to compliant coatings containing replacement solvents, in particular the diisocyanate compounds, is not expected to produce significant risks since coating applicators will be following the coating manufacturers' and recommended safety practices and OSHA's required safety practices for handling materials containing both conventional and replacement solvents. The recommended safety practices for handling these materials are discussed in the "Carcinogenic Effects" section. Additionally, the safety practices and application techniques associated with higher-VOC solvent-borne coatings will be the same for the compliant water-borne coatings. Thus, applicators will not need additional training regarding the proper handling or application of compliant coatings containing TDI.

Significant adverse chronic human health impacts are not anticipated because some solvents used in conventional coatings have the potential to create chronic human health impacts (e.g., EGEE), may be replaced by compliant low-VOC coatings that do not create significant adverse human health impacts. In addition, long-term exposures that could generate significant adverse chronic human health impacts, are not anticipated.

No significant acute human health exposures are anticipated from implementing PAR 1113 because for some coating applications, less toxic coalescing solvents will be used to formulate future compliant low-VOC coatings than is currently the case. Also, the development of spraying technology will further reduce diisocyanate emissions. Based on the brushing, rolling, or spraying of one- or two-component low-VOC systems containing diisocyanate compounds should not expose the public at large to significant adverse human health impacts. In the context of worker (e.g., applicator) exposure, the use of personal protective equipment should provide adequate protection to applicators during coating application.

III. e): Objectionable odors are not expected to change with the use of reformulated coatings because the operation and application of architectural coatings is not expected to change. In fact, the conditions will improve over time as facilities switch to low-VOC materials, such as water-based solvents. In addition, local governments typically have ordinances that are intended to protect the public from adverse odors. SCAQMD Rule 402 – Nuisance, also protects the public from adverse odor impacts.

III. f): The adoption and implementation of PAR 1113 is expected to produce substantial long-term VOC emission reductions by lowering the VOC content limit of coatings, improving air quality and not diminishing any existing air quality rule or future compliance requirement.

In the past Industry Working Group meetings industry representatives raised eight issues which they claim could potentially diminish the goals of the existing rule or potentially cause adverse impacts. The following subsections describe each of the eight issues. The first seven issues are all contentions that the new formulations, either solvent-based or waterborne, result in more coating use, or use of noncompliant coatings, and an overall increase in VOC emissions over a period of time. The eighth issue is the contention that low-VOC waterborne and solvent-borne coatings have a higher reactivity than high VOC coatings formulations and, therefore, contribute at a greater rate to ozone formation. They also contend that under low-NOx conditions, some solvents actually have a negative reactivity. As demonstrated in the following subsections, staff believes these issues do not result in significant adverse air quality impacts.

More Thickness

PROJECT SPECIFIC IMPACT: Industry representatives contend that reformulated compliant water- and solvent-borne coatings are very viscous (e.g., are formulated using a high-solids content) and, therefore, are difficult to handle during application, tending to produce a thick film when applied directly from the can. A thicker film indicates that a smaller surface area is covered with a given amount of material, thereby increasing VOC emissions per unit of area covered.

ANALYSIS: SCAQMD staff evaluated the product data sheets (see Appendix B for a compilation of information obtained from the coating product sheets) for conventional and low-

VOC coatings to compare solids content by volume, coverage area, drying time, etc. Staff has asserted in the past and continues to maintain that a coating with more solids will actually cover a greater surface area. This contention is generally supported for the PAR 1113 affected coating categories. On the average, low-VOC coatings with lower solids content have comparable or higher area of coverage than conventional coatings. Low-VOC coatings, on the average, with a higher solids content have a comparable to slightly less area of coverage than conventional coatings. Many of the coatings at 50, 100 or 275 grams per liter of VOC tend to have 20 to 30 percent solids, similar to products formulated at 50 to 100 grams per liter of VOC, with approximately the same viscosity as their higher VOC counterparts.

Illegal Thinning

PROJECT SPECIFIC IMPACT: The SCAQMD has extensively analyzed the alleged air quality impacts due to more thinning. In oral testimony received by the SCAQMD from a few industry representatives, it has been asserted that thinning occurs in the field in excess of what is allowed by the SCAQMD rule limits. It is asserted that, because reformulated compliant water- and solvent-borne coatings are more viscous (e.g., high-solids content), painters have to adjust the properties of the coatings to make them easier to handle and apply. In particular for solvent-borne coatings this adjustment consists of thinning the coating as supplied by the manufacturer by adding solvent to reduce its viscosity. The added solvent increases VOC emissions back to or sometimes above the level of older formulations.

ANALYSIS: It has been further asserted that manufacturers will formulate current noncompliant coatings by merely increasing the solids content, which would produce a thicker film. Industry claims that a thicker film means less coverage. Therefore, thinning will occur to get the same coverage area as current noncompliant coatings resulting in more VOC emissions per area covered. Based upon manufacturer’s claims regarding coverage, low-VOC coatings have comparable coverage area compared to conventional coatings. As a result, the data indicate that it is not true that a painter will have to thin low-VOC solvent-borne coatings to obtain the same coverage.

Many of the reformulated compliant coatings are water-borne formulations or will utilize exempt solvents, thereby eliminating any concerns of thinning the coating as supplied and increasing the VOC content as applied beyond the compliance limit. Since exempted solvents are not considered a reactive VOC, thinning with them would, therefore, not increase VOC emissions. Water based coatings are thinned with water and would also not result in increased VOC emissions.

A number of additional studies have addressed the thinning issue. The results are detailed below:

- In mid-1991, CARB conducted a field study of thinning in regions of California that have established VOC limits for architectural coatings. A total of 85 sites where painting was in progress were investigated. A total of 121 coatings were in use at these sites, of which

52 were specialty coatings. The overall result of this study was that only six percent of the coatings were thinned in excess of the required VOC limit indicating a 94 percent compliance rate.

- The SCAQMD contracted with an environmental consulting firm, to study thinning practices in the district. In Phase I of the study, consumers who had just purchased paints were interviewed as they left one of a number of stores located in different areas of the district. Seventy solvent-borne paint users responded to the survey. One-third of consumers purchased solvent-borne coatings. Of those surveyed, three (four percent of all solvent-borne paint purchasers) indicated that they planned to thin their coatings before use. In Phase II of the study, the consultant contacted 36 paint contractors. The majority stated that they were using water-borne coatings. Four contractors using solvent-borne paints allowed the consultant to collect paint samples at their painting sites. None of the samples collected were thinned.

- During the 1996 rule amendments to Rule 1113, SCAQMD staff conducted over 60 unannounced site visits to industrial parks and new residential construction sites to survey contractors regarding their thinning practices, coating application techniques, and clean-up practices. Samples were also collected during these site visits for coatings as supplied and as applied, for laboratory analysis and subsequent study of thinning practices. The results of the study indicate that out of the 91 samples taken only nine were thinned with solvents. Out of the nine thinned samples, only two were thinned to the extent that the VOC content limit of the coating, as applied, would have exceeded the applicable rule limit. During pre-arranged visits, however, excessive thinning was observed at only one site at a 1:2 ratio. At this level, the coating was thinned to the point where, according to the professional contractor using it, it did not provide adequate hiding and he had to apply several coats. The practice of over-thinning is expected to inhibit hiding power, application properties, and drying time of a coating.

- In August 2003, the Southern California Alliance of Publicly-Owned Treatment Works (SCAP) published a study conducted by KTA-TATOR that evaluated 21 low-VOC industrial maintenance coating systems suitable for wastewater environments and conveyance facilities, as offered by major manufacturers, specialty manufacturers, as well as low-VOC specialty manufacturers. According to their 2003 Final Report, SCAP states that although the coating systems that complied with the final 100 g/l VOC limit performed as well as the systems with VOC levels of 340 g/l, almost all the coatings in the test program had "challenges" during application. One-third of the coatings required thinning with VOC-containing solvent. Directly due to thinning, two coatings were bumped to a higher VOC category and six coatings had an unknown final VOC content. Since these findings differ from past studies mentioned above, the AQMD is currently investigating what the final VOC content was after thinning and what the manufacturer's recommendations were for applying the coatings (HVLP or airless spray technology), as well as their recommendation for thinning.

Field investigations of actual painting sites in the district and other areas of California that have VOC limits for coatings indicate that thinning of specialty coatings exists but rarely beyond the actual compliance limits. Even in cases where thinning does occur, it is rarer still for paints to be thinned to levels that would exceed applicable VOC content limits. The conclusion is that widespread thinning does not occur often; when it does occur, it is unlikely to occur at a level that would lead to a substantial emissions increase when compared with emissions from higher VOC coatings. Professional contractors can receive Notices of Violation (NOVs) for the practice of over-thinning, as it is illegal under the current version of the rule to exceed the specified compliance limits. It is, therefore, not likely that the proposed rule amendments would increase this practice. During the numerous surprise site visits conducted by SCAQMD staff over many years, inspectors did not observe excess thinning to the degree cited by the industry representatives or to any significant degree. Even if the emission reduction benefits of the rule were reduced very slightly due to over-thinning, there would not be an adverse impact from the amendments.

CONCLUSION: Thinning is not expected to be a problem because a majority of the coatings that would comply with future limits will be waterborne formulations or utilize exempt solvents. Other compliant coatings available may be applied without thinning. Even if some thinning occurs, thinning would likely be done with water or exempt solvents. Finally, current practice indicates that coating applicators do not engage in widespread thinning, and even when thinning occurs, the coatings VOC content limits are not exceeded. As a result, claims of thinning resulting in significant adverse air quality impacts are unfounded.

More Priming

PROJECT SPECIFIC IMPACT: Conventional coatings are currently used as part of a coating system, consisting of one or more of the following components; primer, midcoat, and topcoat. Coating manufacturers and coating contractors have asserted that reformulated compliant low-VOC water- and solvent-borne topcoats do not adhere as well as higher-VOC solvent-based topcoats to unprimed substrates. Therefore, the substrates must be primed with typical solvent-based primers to enhance the adherence quality. Industry representatives have testified that the use of water-borne compliant topcoats, could require more priming to promote adhesion. Additionally, it has been asserted that water-borne sealers do not penetrate and seal porous substrates like wood, as well as traditional solvent-borne sealers. This allegedly results in three or four coats of the sealer per application compared to one coat for a solvent-based sealer would be necessary, resulting in an overall increase in VOC emissions for the coating system.

ANALYSIS: Information from the coating product data sheets indicated that low-VOC coatings do not require substantially different surface preparation than conventional coatings. According to the product data sheets and recommended guidelines from coating associations, conventional and low-VOC coatings require similar measures for preparation of the surface (i.e. apply to clean, dry surfaces), and application of the coatings (i.e. brush, roller or spray). Both low-VOC coatings and conventional coatings for architectural applications have demonstrated the ability to adhere to a variety of surfaces (AVES study). As a part of the staff's technology assessment for Rule 1113, staff analyzed the product data sheets for a variety of low-VOC waterproofing sealers and waterproofing concrete/masonry sealers.

CONCLUSION: As a result, based on the coating manufacturer's coating product data sheets and recommended guidelines from coating associations, the material needed and time necessary to prepare a surface for coating is approximately equivalent for conventional and low-VOC coatings. More primers are not needed because low-VOC coatings possess comparable coverage to conventional coatings, similar adhesion qualities and consistent resistance to stains, chemicals and corrosion, when applied to a properly prepared substrate (refer to the AVES study and the summary of coating characteristics in Appendix B). Low-VOC coatings tend not to require any special surface preparation different from what is required before applying conventional coatings to a substrate. As part of good painting practices for any coating, water-borne or solvent-based, the surface typically needs to be clean and dry for effective adhesion. Consequently, claims of significant adverse air quality impacts resulting from more priming are unfounded.

More Topcoats

PROJECT-SPECIFIC IMPACTS: Coating manufacturers and coating contractors assert that reformulated compliant water- and low-VOC solvent-borne topcoats may not cover, build, or flow-and-level as well as the solvent-borne formulations. Therefore, more coats are necessary to achieve equivalent cover and coating build-up.

ANALYSIS: Technology breakthroughs with additives used in recent formulations of low-VOC coatings have minimized or completely eliminated flow and leveling problems. These flow and leveling agents mitigate flow problems on a variety of substrates, including plastic, glass, concrete and resinous wood. These additives even assist in overcoming flow and leveling problems when coating oily or contaminated substrates. According to the AVES study and the product data sheets for the sampled coatings, water-borne coatings have proven durability qualities. Comparable to conventional coatings, water-borne coatings for architectural applications are resistant to scrubbing, stains, blocking and UV exposure.

CONCLUSION: As demonstrated in both the AVES study and in the summary of coating characteristics in Appendix B, low-VOC when compared to conventional coatings have comparable coverage and, in some cases, superior performance. These low-VOC coatings possess scrub and stain resistant qualities, blocking and resistance to UV exposure for the exterior coatings. Both low-VOC and conventional coatings tend to have chemical and abrasion resistant qualities, gloss and color retention, and comparable adhesion qualities. With comparable coverage and equivalent durability qualities, additional topcoats for low-VOC coatings should not be required.

More Touch-Ups and Repair Work

PROJECT-SPECIFIC IMPACTS: Coating manufacturers and coating contractors assert that reformulated compliant water- and low-VOC solvent-borne formulations dry slowly, and are susceptible to damage such as sagging, wrinkling, alligatoring, or becoming scraped and scratched. They also claim that the high-solids solvent-borne alkyd enamels tend to yellow in dark areas, and that water-borne coatings tend to blister or peel, and also result in severe blocking problems. All of these problems they claim require additional coatings for repair and touch-up.

ANALYSIS: Extra touch-up and repair and more frequent coating applications are related to durability characteristics of coatings. For past rulemaking, staff met with numerous resin and coatings manufacturers to discuss this issue, and also reviewed coating product data sheets and studies conducted to obtain durability information for low-VOC coatings and conventional coatings. Based on information in the coating product data sheets, comparable to conventional coatings, water-borne coatings for architectural applications are resistant to scrubbing, staining, blocking and UV exposure (see Appendix B for coating characteristics). They were noted for excellent scrubability and resistant to mildew. The average drying time between coats for the low-VOC coatings was less than the average drying time for the conventional coatings. In the AVES study, new no-VOC wood coatings demonstrated equivalent dirt pick-up, mar resistance and adhesion, as well as better UV resistance than the commercial higher VOC coatings. On occasion, the average drying time for the lower-VOC coatings did increase more than the conventional coatings and mildew/fungus resistance as well as stain blocking properties were not as good as those of solvent-based coatings (see Appendix B). Even if more paint is occasionally needed for touch up and repair, the amount will not be enough to make a significant adverse impact because small amounts of coatings are used to touch up and repair problem areas.

Staff's technology assessment shows that water-borne coatings are resistant to chemicals, corrosion, chalk, impact and abrasion. Similar to their conventional counterparts, water-borne coatings also tend to retain gloss and color, as well as have good adhesion to a variety of substrates. Further, both low-VOC coatings and conventional coatings tend to be comparable with regards to passing abrasion and impact resistance tests, and are considered to have proven durability qualities.

CONCLUSION: Therefore, based on the durability characteristics information contained in the coating product data sheets, as well as the laboratory testing and field site visits, and demonstrated in the AVES study, low-VOC coatings and conventional coatings have comparable durability characteristics. As a result, it is not anticipated that more touch up and repair work will need to be conducted with usage of low-VOC coatings. Consequently, claims of adverse air quality impacts resulting from touch-up and repair for low-VOC coatings are not significant.

More Frequent Recoating

PROJECT-SPECIFIC IMPACT: Coating manufacturers and coating contractors assert that the durability of the reformulated compliant water- and low-VOC solvent-based coatings is inferior to the durability of the traditional solvent-borne coatings. Durability problems include cracking, peeling, excessive chalking, and color fading, which all typically result in more frequent recoating. As a result, they claim more frequent recoating would be necessary resulting in greater total emissions than would be the case for conventional coatings.

ANALYSIS: The long-term durability of a coating is dependent on many factors, including surface preparation, application technique, substrate coated, and exposure conditions. Again, as mentioned above, key durability characteristics, as discussed in the AVES study and the coating product data sheets (see Appendix B), include resistance to scrub or abrasion, corrosion-, chemicals-, impact-, stain-, and UV- resistance, are similar between conventional and low-VOC coatings. Both low- and high-VOC coatings pass abrasion and impact resistance tests, and have similar durability qualities. According to the coating product data sheets, low-VOC coatings would not need additional surface preparation than what needs to be done to prepare the surface for conventional coatings (see also "More Priming" discussion above). The technique to applying the coatings did not significantly differ either. It is expected that if applied using manufacturers' recommendations, compliant low-VOC coatings are as durable as conventional coatings and, therefore, no additional recoating is required from the usage of low-VOC coatings. Furthermore, overall durability is dependent on the resin technology used in the formulation as well as the quality of pigment, instead of just the amount of solvent present in the coating. This finding has been well corroborated by various laboratory and field testing conducted by the SCAQMD on a variety of coatings.

The durability of a coating is governed by the nature of the binder used in its formulation, which are also known as film formers or resins. Table 2-6 shows the two main resin types currently in use. Acrylic resins are generally associated with low VOC coatings and alkyd resins are typically associated with high VOC coatings. These coatings are exposed to a variety of influences of daily life, including mechanical stresses, chemicals and weathering, against which they serve to protect the substrate. The major impact on the coating film is oxidation by exposure to light, causing the film to first lose color and gloss, and gradually become brittle and incoherent. This is mainly caused by a process known as photochemical degradation. This is especially the case for coatings used for exterior painting.

The coatings industry has developed a variety of additives that act as ultraviolet light (UV) absorbers or free radical scavengers that ultimately slow down the photo-oxidative process, thereby increasing the coating life. Antioxidants and sterically hindered amines are two classes of free radical scavengers, also known as hindered amine light stabilizers (HALS). These can be used with solvent-free or waterborne coatings. Other additives that have a positive effect on durability of coatings include adhesion promoters, corrosion inhibitors, curing agents, reactive diluents, optical brightners, and algicides/mildewcides.

TABLE 2-6

Performance Comparison of Acrylic (Low VOC)
and Alkyd (High VOC)Resin Systems

Acrylic Coatings	Alkyd Coatings
Low-VOC and solvent-free formulations available	Higher VOC formulations
Excellent exterior durability because of high degree of resistance to thermal, photooxidation, and hydrolysis – Pendant groups are ester bonds, but body is C-C bonds, which are much harder to break.	Limited exterior durability because prone to hydrolysis.
Very good color and gloss retention, and resistance to embrittlement	Embrittlement and discoloration issues with age
Require good surface preparation. Since the surface tension is high, the substrate surface needs to be cleaner before application	Minimal surface preparation requirements due to low surface tension. Relatively foolproof applications
Acrylic coatings are generally higher in cost	Lower costs
Polyurethane modified acrylics perform even better, especially in flexibility and in UV resistance.	Rapid drying, good adhesion, and mar resistance. Silicone modified alkyds have higher performance

As indicated earlier in this report, there are numerous types of binders used in the formulation of coatings. However for architectural uses, acrylics and alkyds are the two most commonly used. Utilizing the additives available for improving application and durability characteristics, waterborne acrylic systems have overcome their limitations, and generally outperform solvent-borne coatings, when properly formulated. This finding has been well corroborated by various laboratory and field testing conducted by the SCAQMD on a variety of coatings, including the NTS Phase II Assessment Study, as well as the AVES Study.

CONCLUSION: Coatings manufacturers' own data sheets, as well as the AVES study, indicate that the low-VOC coatings for architectural applications are durable and long lasting. Any durability problems experienced by the low-VOC coatings are not different than those seen with conventional coatings. Recent coating technology has improved the durability of new coatings. Because the durability qualities of the low-VOC coatings are comparable to the conventional coatings, more frequent recoatings would not be necessary.

Substitution

PROJECT-SPECIFIC IMPACT: Coating manufacturers and coatings contractors assert that since reformulated compliant water- and low-VOC solvent-borne coatings are inferior in durability and are more difficult to apply, consumers and contractors will substitute better performing high VOC coatings in other categories for use in categories with low compliance limits. An example of this substitution could be the use of a higher VOC product (e.g., clear wood coatings) currently sold under the small container exemption, which has a higher VOC content limit requirement, in place of a lower-VOC clear wood coatings.

ANALYSIS: There are several reasons why widespread substitution will not occur as a result of the implementation of PAR 1113. First and foremost, based on staff research of resin manufacturers' and coating formulators' product data sheets as well as recent studies conducted, there are, generally, a substantial number of low-VOC coatings in a wide variety of coating categories that are currently available, that have performance characteristics comparable to conventional coatings (see the tables in Appendix B). Second, PAR 1113 seeks to phase-out the small container exemption for clear wood coatings to prevent this type of substitution. Lastly, SCAQMD enforcement records reveal that there is greater than 99 percent compliance rate with Rule 1113. Thus, it highly unlikely that coating applicators will violate PAR 1113 by substituting higher-VOC coatings for lower-VOC coatings.

CONCLUSION: As discussed above, the SCAQMD does not expect that low-VOC coatings used for specific coating applications will be substituted for by higher-VOC coatings used for other specific types of coating applications. Currently, there are a substantial number of low-VOC coatings in a wide variety of coating categories that have performance characteristics comparable to conventional coatings. Additionally, the PAR 1113 phases out the small container exemption for clear wood coatings to prevent this type of substitution. PAR 1113 also requires that when a coating can be used in more than one coating category the lower limit of the two categories is applicable. Lastly, SCAQMD enforcement records indicate that there is greater than 99 percent compliance rate with Rule 1113.

If in the rare event that substitution does occur, PAR 1113 would still achieve overall VOC emission reductions. Although substitution would only result in lesser emission reductions than expected, it would not increase emissions as compared to the existing setting. Consequently, PAR 1113 will not result in significant adverse air quality impacts from the substitution of low-VOC coatings with higher-VOC coatings.

More Reactivity

Different types of solvents have different degrees of "reactivity," which is the ability to accelerate the formation of ground-level ozone. Coating manufacturers and coating contractors assert that the reformulated compliant low-VOC water- and solvent-borne coatings contain solvents that are more reactive than the solvents used in conventional coating formulations. Furthermore, they assert that water-borne coatings perform best under warm, dry weather conditions, and are typically recommended for use between May and October. Since ozone formation is also dependent on the meteorological conditions, use of waterborne coatings during this period increases the formation of ozone.

ANALYSIS: The use of reactivity as a regulatory tool has been debated at the local, state, and national level for over 20 years. For example, CARB incorporated a reactivity-based control strategy into its California Clean Fuel/Low Emissions Vehicle regulations, where reactivity adjustment factors are employed to place regulations of exhaust emissions from vehicles using alternative fuels on an equal ozone impact basis. CARB is evaluating a similar strategy for consumer products and industrial emissions, and contracted with Dr. William Carter, University of California at Riverside, Center for Environmental Research and Technology, College of Engineering, for a study to assess the reactivities of VOC species found in the consumer products emissions inventory. Dr. Carter, one of the principal researchers of reactivities of various VOC species, studied VOC species, more specifically glycol ethers, esters, isopropyl alcohol, methyl ethyl ketone (MEK), and an octanol, since these are typically found in either waterborne coatings, solvent-borne coatings, or both. These specific VOCs have been prioritized based on emissions inventory estimates, mechanistic uncertainties, and lack of information in the current reactivity data. He identified the state of science with respect to VOC reactivity and described areas where additional work is needed in order to reduce the uncertainty associated with different approaches to assessing reactivity.

The contention that more reactive solvents will be used in lieu of traditional less reactive solvents is somewhat misleading because the coating categories affected by these rule amendments currently contain reactive and highly toxic solvents such as toluene, xylene, MEK, etc. Furthermore, Harley, et al., (1992) noted, "The speciated organic gas emissions from use of solvent-borne architectural coatings are 24 percent more reactive than the official [VOC] inventory would suggest." This observation suggests that solvent-borne architectural coatings may actually be more reactive than low-VOC coatings especially water-based coatings. Therefore, there is a need for further study of the chemical composition of industrial surface coatings and the detailed composition of petroleum distillate solvents incorporated in surface coatings.

To date, Dr. Carter has compiled some information regarding the reactivity of VOCs and has established several different reactivity scales. However, he cautions the use of these scales due to the uncertainties involved; for example, "Deriving such numbers is not a straightforward matter and there are a number of uncertainties involved. One source of uncertainty in the reactivity scales comes from the fact that ozone impacts of VOCs depend on the environment where the VOC is emitted. A second source of uncertainty is variability in the chemical composition of the VOC source being considered. Complex mixtures such as "mineral spirits" may be more difficult to characterize and may vary from manufacturer to manufacturer though in principal the composition of a given lot can be determined and reasonably assumed to be constant regardless of how the product is used. A third source of uncertainty comes from the complexity and uncertainties in the atmospheric processes by which emitted VOCs react to form ozone.

According to Dr. Carter, reliable reactivity numbers do not currently exist from which accurate air quality policy can be derived based on reactivity and not total VOC emissions. Further, Dr. Carter, asserts that ketones are the most important class of consumer emissions for which there are no environmental chamber reactivity data suitable for evaluating reactivity predictions. He also finds no experimental reactivity data for glycols or alcohols suitable for mechanism evaluation.

Another factor to be considered in the reactivity based approach, and probably the most important, is an accurate speciation profile of water-borne and solvent-borne coatings. As a part of the 2000 CARB survey, the latest speciation profile being used to conduct on-going studies in reactivity.

In spite of the studies identified above, reactivity data for VOCs, especially those compounds used to formulate consumer and commercial products, are extremely limited. This is essentially the conclusion reached by EPA in a 1995 report to Congress which states, “better data, which can be obtained only at great expense, is needed if the EPA is to consider relative photochemical reactivity in any VOC control strategy.”

The SCAQMD Board adopted a resolution in 1999 to conduct reactivity and availability assessments of solvents present in architectural coatings to assess the feasibility of a reactivity-based, alternative regulatory approach. In addition, there is a desire to understand the interaction between the architectural coatings emissions with other emission sources such as mobile sources in the formation of ozone. In April 2003, the SCAQMD approved a contract with CE-CERT to carry out an environmental chamber study to assess the ozone and PM formation potential of selected types of VOCs emitted from architectural coatings and selected mixtures represent current mobile source emissions. The project is to use this chamber to assess ozone impacts of selected architectural coatings VOCs. This proposed SCAQMD project will cover environmental chamber studies of additional types of VOCs present in water-based architectural coatings and also chamber studies of VOC surrogate mixtures representing current mobile-source-dominated emissions, and characterization of PM formation potentials of the VOCs studied.

Furthermore, the architectural coatings industry is funding additional studies to further understand the mechanistic and kinetic reactivities of different VOC species. The results of all the aforementioned research and studies will be invaluable in determining the extent to which a reactivity based approach can be relied on for regulating VOC emissions from the application of coatings and the use of solvents.

Until the results of this research and studies are completed and peer reviewed, the SCAQMD believes that it would not be prudent to implement a reactivity-based ozone reduction strategy based on incomplete science. This is consistent with USEPA’s conclusion that regulation should be based on total mass VOC emissions and should not attempt to regulate based on reactivity. Therefore, the SCAQMD will continue to monitor, participate and administer studies related to enhanced reactivity data for VOC species, including directly participating in studies pertaining to reactivity of solvents in architectural coatings.

CONCLUSION: In the absence of actual reactivity numbers for the compounds contained in “traditional” solvent formulations and compliant, low-VOC coatings, emissions must be calculated in the standard manner of total VOC per unit of coating applied manner. Based upon the current state of knowledge regarding VOC reactivity, it is speculative to conclude that the proposed amendments will generate significant adverse air quality impacts due to increased reactivity.

On June 16, 1995, the USEPA determined that acetone, PCBTF, VMS as well as other solvents have low photochemical reactivity and should be exempted from consideration as a VOC. The SCAQMD subsequently amended Rule 102 on November 17, 1995, to add acetone and other solvents to the definition of Group I exempt compounds, which are non-VOC by definition.

Oxsol 100 (p-chlorobenzotriflouride, PCBTF), manufactured by Occidental Chemical Corporation, was also delisted as a VOC in 1995. This solvent can be used to extend or replace many organic solvents, including toluene, xylene, mineral spirits, acetone, methyl ethyl ketone, trichloroethylene, and perchloroethylene. Toxicity data of PCBTF was assessed by OEHHA and it was not considered to have a significant toxic risk. This product is less toxic than toluene and is not considered a Hazardous Air Pollutant or an Ozone-Depleting Substance. The USEPA is also in the process of delisting t-butyl acetate, which may also help coating formulators in utilizing exempt solvents in their formulations.

Synergistic Effects of the Eight Issues

Coatings manufacturers have also alleged that not only should each of the eight issues (e.g., more thickness, illegal thinning, more priming, more topcoats, more touch-up and repair, more frequent recoating, more substitution, and more reactivity) be analyzed separately but that the synergetic effect of all issues be analyzed. As discussed above, the SCAQMD staff's research and analysis of resin manufacturers' and coating formulators' product information sheets concludes that on each separate issue that the low-VOC compliant coatings have comparable performance as current coatings or industry's specific assertions are unfounded. Therefore, since individually each issue does not result in a significant adverse air quality impact, the synergistic effect of all eight issues will not result in significant adverse air quality impacts. Even if it is assumed that some of the alleged activities do occur, e.g., illegal thinning, substitution, etc., the net overall effect of the proposed amendments is expected to be a reduction in VOC emissions.

Low Vapor Pressure

While not argued as one of the alleged eight issues discussed previously, coatings manufacturers have asserted that coating solvents should not be regulated as a VOC at all. These solvents currently used in consumer products and architectural coatings are considered low volatility compounds, meaning that they have a vapor pressure of less than 0.1 millimeter of mercury (mm of Hg) at 20 degrees Celsius. While CARB has included a low vapor pressure (LVP) exemption in its Consumer Products regulation, its staff indicate that the LVP exemption was placed into the proposed rule for some additives found in consumer products, such as surfactants, paraffin, and other heavier compounds that do not readily evaporate into the atmosphere and are typically washed away into the sewer. Since the VOCs in paints do and are intended to evaporate into the atmosphere, CARB does not support the LVP exemption for architectural coatings and did not include the LVP exemption into its Aerosol Coatings rule. USEPA staff also does not support an LVP exemption for the architectural coatings rule and did not include such an exemption in the National Architectural Coatings Rule. Based upon its test methodology, USEPA concludes that VOCs from architectural coatings do evaporate into the air and therefore should not be exempted.

The SCAQMD concurs with USEPA and CARB decisions to not include a LVP exemption for architectural coatings. Nevertheless, the SCAQMD will continue to work with CARB staff in identifying issues, participating in future studies, and monitoring the result of any studies. Additionally, CE-CERT will coordinate with the Reactivity Research Working Group to study the availability of some solvent species commonly found in architectural coatings.

Based on the above consideration, significant adverse impacts to air quality are not expected from PAR 1113. Since there are no significant adverse impacts, no mitigation measures are required.

	Potentially Significant Impact	**Less Than Significant Impact**	**No Impact**
IV. BIOLOGICAL RESOURCES. Would the project:			
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	¤	¤	
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	¤	¤	
c) Have a substantial adverse effect on federally protected wetlands as defined by §404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	¤	¤	
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	¤	¤	

e) Conflicting with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	¤	¤		
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	¤	¤		

IV. a), b), d): Implementation of the proposed amendments will not cause impacts to sensitive habitats of plants or animals because all activities will typically occur at construction, industrial or commercial sites already in operation. The intent of the proposed amendments is to reduce VOC emissions from affected coating categories. Therefore, the proposed amendments to Rule 1113 will have no direct or indirect impacts that could adversely affect plant or animal species or the habitats on which they rely in the SCAQMD's jurisdiction. The net effect of implementing the proposed amended rule will be improved air quality resulting from reduced VOC emissions, which is expected to be beneficial for both plant and animal life. Modifications at existing affected coating manufacturers to switch to low-VOC coatings, such as water-based, would not require acquisition of additional land or further conversions of riparian habitats or sensitive natural communities where endangered or sensitive species may be found.

IV. c): Acquisition of protected wetlands is not expected to be necessary to switch to low-VOC coatings, such as water-based. Affected coating categories would continue to practice existing operating procedures so the proposed amended rule will not directly remove, fill or interrupt any hydrological system or have an adverse effect on federally protected wetlands. In addition, potential impacts to aquatic life from releases of excess paint and associated wastewater disposed of in sewer and storm drains is discussed in the "Water Quality Impacts" section. The analysis of water quality impacts to both groundwater and surface water concluded that PAR 1113 would not generate significant adverse water quality impacts

IV. e), f):There are no provisions in the proposed amended rule that would adversely affect land use plans, local policies or ordinances, or regulations. Land use and other planning considerations are determined by local governments and no land use or planning requirements will be altered by the proposed project. The proposed amended Rule 1113 would not affect in any way habitat conservation or natural community conservation plans, agricultural resources or operations, and would not create divisions in any existing communities.

Based on the above consideration, significant adverse impacts to biological resources are not expected from PAR 1113. Since there are no significant adverse impacts, no mitigation measures are required.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
V. CULTURAL RESOURCES. Would the project:			
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	¤	¤	
b) Cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?	¤	¤	
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	¤	¤	
d) Disturb any human remains, including those interred outside of formal cemeteries?	¤	¤	

V. a) - d): There are existing laws in place that are designed to protect and mitigate potential impacts to cultural resources. Reformulation of architectural coatings won't require major construction activities such as grading, trenching, etc. The application of architectural coatings typically occurs after construction where archaeological resources would have already been disturbed or assessed. The proposed revisions to Rule 1113 are, therefore, not anticipated to result in any activities or promote any programs that could have a significant adverse impact on cultural resources in the district. As a result, the proposed project has no potential to cause a substantial adverse change to a historical or archaeological resource, directly or indirectly destroy a unique paleontological resource or site or unique geologic feature, or disturb any human remains, including those interred outside a formal cemeteries.

Based on the above consideration, significant adverse impacts to cultural resources are not expected from PAR 1113. Since there are no significant adverse impacts, no mitigation measures are required.

VI. ENERGY. Would the project:	**Potentially Significant Impact**	**Less Than Significant Impact**	**No Impact**
a) Conflict with adopted energy conservation plans?	¤	¤	
b) Result in the need for new or substantially altered power or natural gas utility systems?	¤	¤	
c) Create any significant effects on local or regional energy supplies and on requirements for additional energy?	¤	¤	
d) Create any significant effects on peak and base period demands for electricity and other forms of energy?	¤	¤	
e) Comply with existing energy standards?	¤	¤	

VI. a), e): Lowering VOC content limits at affected facilities will not conflict with adopted energy conservation plans or cause affected facilities to be out of compliance with existing energy standards because affected equipment would basically continue current operations although using new formulations of affected coatings. Because add-on control equipment is not expected to be used to comply with the provisions of PAR 1113, no additional energy use is expected to be required. Additionally, PAR 1113 will not substantially increase the number of businesses or amount of equipment in the district and, therefore, would not be expected to interfere with existing energy standards or future energy conservation plans because these are typically targeted to residential consumers, etc.

VI. b), c), d): The architectural coating operations are not expected to change as a result of lowering the VOC content limit of affected coatings. Since there will be no additional demand for electricity, there will be no need for new or substantially altered power or natural gas utility systems as a result of the proposed project. The proposed project will have a non-significant effect on the electricity capacity or demand and, therefore, no significant impact on peak or base demands for electricity.

Based on the above consideration, significant adverse impacts to energy are not expected from PAR 1113. Since there are no significant adverse impacts, no mitigation measures are required.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
VII.	**GEOLOGY AND SOILS.** Would the project:			
a)	Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	¤	¤	
	• Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	¤	¤	
	• Strong seismic ground shaking?	¤	¤	
	• Seismic–related ground failure, including liquefaction?	¤	¤	
	• Landslides?	¤	¤	
b)	Result in substantial soil erosion or the loss of topsoil?	¤	¤	
c)	Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	¤	¤	
d)	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	¤	¤	
e)	Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	¤	¤	

VII. a): Architectural coatings are applied to buildings, stationary structures, roads, etc. The proposed amendments affect coating formulators and have no effects on geophysical formations in the district. The coating activity will not change from current practice so the proposed amendments to Rule 1113 will not expose people to potential substantial geological effects greater than what they are exposed to already. Lowering the VOC content limit of affected coating categories will not expose people or structures to risks of loss, injury, or death involving: rupture of an earthquake fault, seismic ground shaking, ground failure or landslides.

VII. b): The proposed project will not require major construction activities (e.g., grading, trenching, refilling and repaving), so there is no potential impacts to existing geophysical conditions. No soil is expected to be disrupted because no new development will be required as a result of the proposed project. Therefore, no substantial soil erosion or loss of topsoil is expected from the lowering of the VOC content limit for affected coating categories.

VII. c), d): The proposed project does not involve construction of new structures and, therefore, will not involve locating any structures on soil that is unstable or expansive. However, as already noted, no soil disturbance is anticipated, therefore, no destabilization of unstable soils would be expected that could cause on- or off-site landslides, lateral spreading, subsidence, liquefaction or collapse.

VII. e): The proposed project does not involve the installation of septic tanks or alternative waste water disposal systems. Therefore, this type of soil impact will not occur.

Based on the above consideration, significant adverse impacts to geology and soils are not expected from PAR 1113. Since there are no significant adverse impacts, no mitigation measures are required.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
VIII. HAZARDS AND HAZARDOUS MATERIALS. Would the project:			
a) Create a significant hazard to the public or the environment through the routine transport, use, and disposal of hazardous materials?	¤	¤	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	¤	¤	
c) Emit hazardous emissions, or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	¤	¤	
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result,	¤	¤	

	would create a significant hazard to the public or the environment?		
e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	¤	¤
f)	For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	¤	¤
g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	¤	¤
h)	Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	¤	¤
i)	Significantly increased fire hazard in areas with flammable materials?	¤	¤

VIII. a), b), c): Architectural coating operations are not expected to change from current practice and, thus, the amount of solvents used is not expected to change. In fact, in order to comply with the lower VOC content limits, affected coatings are expected to be formulated with less solvents and more water, which are typically less hazardous than currently used. As mentioned earlier and noted in Table 2-3, there are a range of potential adverse health effects associated with toxic substances currently formulated in AIM coatings. The actual effects of exposure to coatings, however, depend on such factors as the exposure duration, potency of the solvents of concern, exposure frequency, and other factors.

Hazard impact concerns are related to the risk of fire, explosions, or the release of hazardous substances in the event of an accident or upset conditions. It is expected that the lower VOC content limits required by PAR 1113 may be achieved, in part, through the use of replacement solvents and predominantly water-borne technologies. Overall, exempt solvents are considered to be viable alternatives to other, more toxic solvents currently found in various coatings.

Additionally, coalescing solvents such as propylene glycol, and ethylene glycol may be used more widely in low-VOC water-borne formulations as alternatives to more toxic coalescing solvents such as EGEE and EGME. Furthermore, diisocyanates (e.g., HDI, MDI, and TDI) may be used more widely in low-VOC two component urethane systems as condensation reaction agents.

As noted in Table 2-7, the flammability classifications by the NFPA are the same for acetone, t-butyl acetate, toluene, xylene, MEK, isopropanol, butyl acetate, and isobutyl alcohol. Recognizing that as a “worst-case” acetone has the lowest flashpoint, it still has the highest Lower Explosive Limit, which means that acetone vapors will not cause an explosion unless the vapor concentration exceeds 26,000 ppm.

In contrast, toluene vapors can cause an explosion at 13,000 ppm, which poses a much greater risk of explosion. The concentration of xylene vapors that could cause an explosion is even lower at 10,000 ppm. Under operating guidelines of working with flammable coatings under well-ventilated areas, as prescribed by the fire department codes, it would be difficult to achieve concentrated streams of such vapors.

Furthermore, any increase in accidental releases of compliant acetone-based coatings would be expected to result in a concurrent reduction in the number of accidental releases of existing coating materials. As shown in Table 2-7 many of the solvents used in conventional solvents are as flammable as acetone, so there would be no net change or possibly a reduction in the hazard consequences from replacing some conventional solvents with acetone.

TABLE 2-7

Chemical Characteristics for Common Coating Solvents

Traditional/Conventional Solvents						
Chemical Compounds	**M.W.**	**Boiling Point** (^{o}F)	**Flashpoint**[a] (^{o}F)	**Vapor Pressure** (mmHg @ 68 ^{o}F)	**Lower Explosive Limit** (% by Vol.)	**Flammability Classification** (NFPA)*
Toluene	92	231	40	22	1.3	3
Xylene	106	292	90	7	1.1	3
MEK	72	175	21	70	2.0	3
Isopropanol	60	180	53	33	2.0	3
Butyl Acetate	116	260	72	10	1.7	3
Isobutyl Alcohol	74	226	82	9	1.2	3
Stoddard Solvent	144	302 - 324	140	2	0.8	2
Petroleum Distillates (Naptha)	100	314 - 387	105	40	1.0	4
EGBE	118	340	141	0.6	1.1	2
EGME	76	256	107	6	2.5	2
EGEE	90	275	120	4	1.8	2

TABLE 2-7 (CONCLUDED)

Chemical Characteristics for Common Coating Solvents

Replacement Solvents						
Chemical Compounds	**M.W.**	**Boiling Point** (°F)	**Flashpoint**[a] (°F)	**Vapor Pressure** (mmHg @ 68 °F)	**Lower Explosive Limit** (% by Vol.)	**Flammability Classification** (NFPA)*
Acetone	58	133	1.4	180	2.6	3
Di-Propylene Glycol	134	451	279	30	1	1
Propylene Glycol	76	370	210	0.1	2.6	1
Ethylene Glycol	227	388	232	0.06	3.2	1
texanol	216	471	248	0.1	0.62	1
Oxsol 100	181	282	109	5	0.90	1
t-Butyl Acetate	113	208	59		1.5	3
Hexamethylene Diisocyanate (HDI)	168	415	284	0.5	1	1
Methylene Bisphenyl Diisocyanate (MDI)	250	314	385	0.5	1	1
Toluene Diisocyanate (TDI)	174	200	270	0.04	1	1

*National Fire Protection Association

0 = minimal; 1 = slight; 2 = moderate; 3 = serious; 4 = severe

Although acetone is expected to be used to formulate some future compliant AIM coatings, current information from coating products indicate that the majority of the future compliant coatings are expected to be reformulated with water-borne technologies. Therefore, it is unlikely that PAR 1113 will substantially increase the future usage of acetone in the district.

With regard to other possible replacement solvents, based on discussion with resin manufacturers and coating formulators, the trend in coating technologies is to replace EGEE, EGME, etc., with less toxic/hazardous coalescing solvents such as ethylene glycol, and propylene glycol. Further, it appears from this information that the use of solvents, such as propylene glycol in water-borne coating formulations, is prevalent today and should continue into the future with the eventual replacement of more toxic and hazardous coalescing solvents such as EGEEs with less or nontoxic coalescing solvents. The latest CARB survey corroborates with these trends.

As noted previously, some future compliant two-component urethane coating systems may contain diisocyanate compounds. While the trend of using less hazardous compounds is not reflected by the use of diisocyanate compounds, there should be no significant increase in the hazard risks due to the potential for increased use of these compounds because there will be a small increase which is offset by the decrease in toxics previously used. Like texanol, oxsol 100, propylene glycol, and ethylene glycol, diisocyanates are significantly less flammable as compared to currently used highly flammable conventional solvents. Therefore, the potential increased use of compliant coatings containing diisocyanates will be offset by the decrease use of more flammable solvents.

Potential hazard impacts resulting from adopting and implementing PAR 1113 are not expected to be significant for the following reasons. The increased usage of acetone as a result of implementing PAR 1113 will generally be balanced by reduced usage of other equally or more hazardous materials such as MEK, toluene, xylene, etc. Further, emergency contingency plans that are already in place are expected to minimize potential hazard impacts posed by any increased use of acetone in future compliant coatings. In addition, businesses are required to report increases in the storage of flammable and otherwise hazardous materials to local fire departments to ensure that adequate conditions are in place to protect against hazard impacts.

Interviews with four local fire departments during the 1996 amendments to Rule 1113 revealed that all four departments would be equally concerned with any coating or solvent, which has a flashpoint below 65 degrees Fahrenheit. Currently, several conventional coatings generally have flashpoints below 65 degrees Fahrenheit. Based on inquiries from the SCAQMD, Captain Michael R. Lee, of the Petroleum-Chemical Unit for the County of Los Angeles Fire Department, submitted a letter to the SCAQMD stating that the Uniform Fire Code (UFC) treats solvents such as acetone, butyl acetate, MEK, and xylene as Class I Flammable Liquids. Further, the UFC considers all of these solvents to present the same relative degree of fire hazard. The UFC also sets the same requirements for the storage, use and handling of all four solvents. Captain Lee goes on to state, "In my opinion, acetone presents the highest degree of fire hazard of the four solvents considered, but not significantly more hazardous than the others. All four should be used with extreme caution, with proper safeguards in place."

The County of Los Angeles, Fire Department, Fire Prevention Guide #9 regulates spray application of flammable or combustible liquids. The guide requires no open flame, spark-producing equipment or exposed surfaces exceeding the ignition temperature of the material being sprayed within the area. For open spraying, as would be the case for the field application of the acetone-based coatings, no spark-producing equipment or open flame shall be within 20 feet horizontally and 10 feet vertically of the spray area. Anyone not complying with the above guidelines would be in violation of current fire codes. The fire department limits residential storage of flammable liquids to five gallons and recommends storage in a cool place. If the flammable coating container will be exposed to direct sunlight or heat, storage in cool water is recommended. Finally all metal containers involving the transfer of five gallons or more should be grounded and bonded.

Another reason hazard impacts from implementing PAR 1113 are not expected to be significant is that it is anticipated that resin manufacturers and coating formulators will continue the trend of using less toxic or hazardous solvents such as texanol, oxsol 100, propylene glycol, ethylene glycol, etc., in their compliant water-borne coatings. As a result, it is expected that future compliant AIM coatings will contain less or non-hazardous materials compared to conventional coatings, a net benefit. While diisocyanates are more toxic, their flammability is significantly less than current solvents. Thus, overall hazard risks are not significantly increased as a result of using compliant coatings containing diisocyanates.

No additional transport of the solvents is expected and, thus, no new hazards to the public will be created through transport, use or disposal of hazardous materials. Consequently, the proposed amendments to Rule 1113 will not create a significant new hazard to the public or create a reasonably foreseeable upset involving the release of hazardous materials. Similarly, emissions from affected facilities will not increase but will decrease.

VIII. d): Government code §65962.5 refers to hazardous waste handling practices at facilities subject to the Resources Conservation and Recovery Act (RCRA). Since the proposed project would lower the usage of hazardous materials, hazardous waste handling practices, if any, at regulated facilities would not be affected. However, it is expected that any facility using affected coatings that are on the §65962.5 list will continue to comply with any applicable requirements.

VIII. e), f): Even for facilities that may be located near airports or private airstrips, the proposed project will not create new safety hazards because any affected coating operations are not expected to change their current practices.

VIII. g): Reducing the VOC content of affected coatings is not expected to affect a user's ability to comply, and not interfere, with all adopted emergency response plans and emergency evacuation plan because existing coating activities are not expected to be alterd by the proposed project.

VIII. h), i): Affected coating categories are currently formulated with toxic substances listed in Table 2-3 and 2-7. Eventually, affected facilities are required to comply with lower VOC content limit requirements, which is likely to happen through reformulation of the solvent or conversion to alternative resin technologies. It is anticipated that the reformulation will entail the use of water-based components or low-VOC materials less hazardous or flammable than currently being used. The Uniform Fire Code and Uniform Building Code set standards intended to minimize risks from flammable or otherwise hazardous materials. Local jurisdictions are required to adopt the uniform codes or comparable regulations. Local fire agencies require permits for the use or storage of hazardous materials and permit modifications for proposed increases in their use. Permit conditions depend on the type and quantity of the hazardous materials at the facility. Permit conditions may include, but are not limited to, specifications for sprinkler systems, electrical systems, ventilation, and containment. The fire departments make annual business inspections to ensure compliance with permit conditions and other appropriate regulations. Consequently, local fire departments ensure that adequate permit conditions are in place to protect against potential risk of upset from the use of hazardous materials. However, any use of hazardous materials at affected facilities is not expected to change and may even decrease as a result of implementing the proposed project.

Based on the above consideration, significant adverse impacts to hazards and hazardous materials are not expected from PAR 1113. Since there are no significant adverse impacts, no mitigation measures are required.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
IX. HYDROLOGY AND WATER QUALITY. Would the project:			
a) Violate any water quality standards or waste discharge requirements?	¤	¤	
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	¤	¤	
c) Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site?	¤	¤	
d) Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	¤	¤	
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	¤	¤	
f) Otherwise substantially degrade water quality?	¤	¤	
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	¤	¤	

h)	Place within a 100-year flood hazard area structures which would impede or redirect flood flaws?	¤	¤
i)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	¤	¤
j)	Inundation by seiche, tsunami, or mudflow?	¤	¤
k)	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	¤	¤
l)	Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	¤	¤
m)	Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	¤	¤
n)	Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	¤	¤
o)	Require in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	¤	¤

IX. a), f): Lowering the VOC content limit of coatings at affected facilities will have no direct or indirect impact on hydrology and water quality because the reformulation of the coatings is not expected to change the current architectural coating operation practices or alter the coating formulations to be more detrimental to water quality. It is likely that resin manufacturers and coating formulators will replace conventional coating formulations, which may contain toluene, xylene, mineral spirits, acetone, methyl ethyl ketone (MEK), tricholorethylene, and percholoroethylene, with either exempt solvents (e.g., acetone, Oxsol 100, t-butyl acetate) or water-borne formulations. In addition to the above-mentioned solvents, coalescing solvents such as propylene glycol, and ethylene glycol may be used more widely in low-VOC water-borne formulations as alternatives to more toxic coalescing solvents such as EGEE and EGME.

Furthermore, increased usage of diisocyanates (e.g., HDI, MDI, and TDI) may occur in low-VOC two component, water-borne urethane systems as condensation reaction agents to replace their higher-VOC solvent-borne counterparts.

In the past the SCAQMD has received comments that with the increased use of water-borne technologies to meet the lower VOC content limits, there will be a greater trend of coating applicators to improperly dispose of the waste generated from these coatings into the ground, storm drains, or sewer systems. However, there are no data to support this contention. In any event, there are several reasons why there should be no significant increase over current practices for improper disposal due to greater use of water-borne coatings.

Results from a survey of contractors determined that a majority either dispose of the waste material properly as required by the coating manufacturer's MSDS or recycle the waste material regardless of type of coating. Based upon these results, there is no reason to expect that paint contractors will change their disposal practices, especially those that dispose of wastes properly, with the implementation of PAR 1113.

Impacts to water quality from reformulated coatings (i.e., water-based coatings) would be due to the increased use of water for clean-up and the potential resultant increased discharge into the sewer system. POTWs in the region are expected to be able to accommodate the potential increase in wastewater associated with reformulated coating. (The POTWs have an overall capacity of about 1,700 million gallons per day – see Table 2-8.) Further, state and federal regulations are expected to promote the development and use of coatings formulated with non-hazardous solvents. Based on discussions with resin manufacturers and coating formulators, the trend in coating technologies is to replace toxic/hazardous solvents (e.g., EGEEs) with less toxic/hazardous solvents (e.g., ethylene glycol, and propylene glycol). Therefore, wastewater which may be generated from reformulated coatings is expected to contain less hazardous materials than the wastewater generated for solvent-based coating operations, thereby reducing toxic influent to the POTWs. The amount of increased wastewater generated from coating operations would be well within the capacity of the regions POTWs. Consequently, wastewater impacts from coating reformulation are not considered significant.

It should be noted that the National Paints and Coatings Association's "Protocol for Management of Post Consumer Paint," and the SCAQMD's "Painter's Guide to Clean Air" provide the public and painting contractors with information as to the environmentally sound coating disposal practices. These public outreach programs are expected to reduce the amount of coating waste material entering the sewer systems, storm drainage systems, and being dumped on the ground. Therefore, further reducing any water quality impacts associated with the improper disposal of compliant coatings.

Future compliant AIM coatings are expected to be formulated primarily with water-borne technologies. As a result, more water will be used for clean-up and the resultant wastewater material could be disposed of into the public sewer system. It is anticipated that current coating equipment (i.e., spray guns, rollers, and brushes) clean-up practices of using water will continue into the future. Table 2-8 illustrates the "worst-case" potential increase of waste material likely to be received by POTWs in the district as a result of implementing PAR 1113.

The EPA in its Report to Congress entitled "Study of Volatile Organic Compound Emissions from Consumer and Commercial Products" evaluated consumer products to determine which categories were likely to be disposed of to POTWs. The study found that the likelihood of paints, primers, and varnishes being disposed of to POTWs was low. Therefore, this category was not even evaluated for its VOC emission impacts on POTWs. This suggests that the presence of solvents from this category of consumer products in wastewater streams is very low compared to the total volume of solvents being disposed of from other consumer product categories.

In addition, as discussed earlier, water-borne coatings are increasingly becoming less toxic than current coatings. To that extent, it is likely that adverse impacts to water quality will actually decrease as compared to the existing situation. Table 2-8 shows the historical and projected POTW impact from reformulated coatings.

TABLE 2-8

Historical and Projected POTW Impact From Reformulated Coatings

Year	**POTW Average Daily Flow**[a] (mgd)	**POTW Capacity**[b] (mgd)	**Estimated Usage** (gallons/year)	**Coatings Disposal Daily Flow**[c] (mgd)	**Total Impacts** (% Increase)
2003	1394.00	1687.30	2,795,277	0.0076	0.00045
2006	1394.00	1687.30	3,073,448	0.0084	0.00049

[a] 2002 data of total average daily wastewater flows handled by all POTWs greater than 10 mgd in the district (2003 AQMP).
[b] Based on design daily flows by all POTWs greater than 10 mgd in the district (2003 AQMP).
[c] Assumes that one gallon of water will be used to clean-up equipment for every gallon of coating applied. The figures for Coatings Disposal Flow are based on the annual emissions inventory of the affected coating categories (2003) and their projected future sales until compliance in 2006; originally expressed in mgy, they are converted to mgd by dividing by 365.
mgd = millions of gallons per day

The potential increase is considered to be well within the existing and projected capacity of POTWs in the district. Hence, wastewater impacts associated with the disposal of water-borne clean-up waste material generated from PAR 1113 affected coating categories are not considered significant. With the increasing trend toward less toxic water-borne, it is likely that there will be less adverse impacts to water quality. Therefore, PAR 1113 will not adversely affect water resources, water quality standards, groundwater supplies, water quality degradation, existing water supplies or wastewater treatment facilities.

IX. b), n): Historically, potential water demand to reformulate conventional coatings into waterbased coatings and to clean up waterbased coatings has not resulted in a significant adverse impact on water demand or deplete groundwater supplies. As shown in Table 2-9, water demand impacts associated with the manufacture and clean-up of water-borne formulations (included as a "worst-case"), currently and in the future, are anticipated to create a negligible incremental water demand impact and do not exceed the SCAQMD's significant threshold of 5,000,000 gallons per day.

While it is not possible to predict water shortages in the future, existing entitlements and resources in the district provide sufficient water supplies that currently exceed demand. Further, according to the Metropolitan Water District (MWD), the largest supplier of water to California, "For its part, Metropolitan expects to be able to meet 100 percent of its member agencies' water needs for the next ten years, even during times of critical drought. Metropolitan and its member agencies have identified and are implementing programs and projects to assure continued reliable water supplies for at least the next 20 years."[1] MWD is expected to continue providing a reliable water supply through developing a portfolio of diversified water sources that includes: cooperative conservation; water recycling; and groundwater storage, recovery, and replenishment programs. Other additional water supplies will be supplied in the future as a result of water transfer from other water agencies, desalination projects and state and federal water initiatives, such as CALFED and California's Colorado River Water Use Plan.

TABLE 2-9

Historical and Projected Water Demand for Reformulated Coatings

Year	**Projected Population**[a] (millions of people)	**Projected Water Demand**[b] (bgy)	**Projected Coating Sales**[c] (mgy)	**Projected Mfgr Demand**[d] (mgy)	**Projected Cleanup Demand**[e] (mgy)	**PAR 1113 Total Demand**[f] (mgy)	**Total Impacts**[g] (% Increase)
2003	16.46	1,635.55	2.79	2.79	2.79	5.58	0.0003
2006	17.04	1,414.84	3.07	3.07	3.07	6.14	0.0004

[a] Population projections obtained from SCAG's 1998 RTP.
[b] Water demand and supply projections obtained from Hydrology Existing Setting in 2003 AQMP. AF (acre- feet) equals approximately 326,000 gallons
[c] SCAQMD Staff Report for PAR 1113.
[d] Assumes that one gallon of water will be used to manufacture one gallon of coating applied. Also assumes as a "worst-case" scenario, that all affected coatings used in the SCAQMD's jurisdiction were manufactured here.
[e] Assumes that one gallon of water will be used to clean-up equipment for every gallon of coating applied. Also assumes as a "worst-case" scenario, that full conversion of affected coating categories to water-borne formulations occurs in 2006.
[f] Total amount of manufacturer and clean-up water demand.
[g] The percentage increase in water demand as a result of the incremental increase due to water clean-up of water-borne coating material.

Acronyms: bgy = billion gallons per year; mgy = millions of gallons per year

As shown in Table 2-9, it is within the capacity of the local water suppliers to supply the small incremental increase in water demand associated with the implementation of PAR 1113. Sufficient water supplies are available to serve the project from existing entitlements and no are

[1] From Metropolitan Water District, Annual Progress Report to the California's State Legislature, February 2002.

new or expanded entitlements are needed to implement the proposed project. Therefore, no significant water demand impacts are expected as the result of implementing PAR 1113.

IX. g), h): Since PAR 1113 does not require construction of new structures, it will not result in placing housing in a 100-year flood hazard areas. Architectural coating contractors are not expected to change their existing current practices so any flood hazards would be part of the existing setting.

IX. c), d), e): The proposed project would not change current architectural coating application or practices. Consequently, no major construction activities will be necessary to comply with PAR 1113, so the proposed project will not alter any existing drainage patterns, increase the rate or amount of surface runoff water that would exceed the capacity of existing or planned stormwater drainage systems.

IX. l), m), o): Because no significant increase of water or waste results from the coating activity, the proposed project would not generate additional volumes of wastewater that could exceed the capacity of existing stormwater drainage systems or require the construction of new wastewater or stormwater drainage facilities.

IX. k): Since the proposed project will not change architectural coating operations, no changes to existing wastewater treatment permits would be necessary so they would still be expected to comply with existing wastewater treatment requirements of the applicable Regional Water Quality Control Board.

IX. i), j): Since PAR 1113 does not require construction of new facilities, it will not alter existing flood risks or risks from seiches, tsunami's or mudflow conditions.

Based on the above considerations, significant adverse impacts to hydrology and water quality are not expected from PAR 1113. Since there are no significant adverse impacts, no mitigation measures are required.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
X. LAND USE AND PLANNING. Would the project:			
a) Physically divide an established community?	¤	¤	
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program	¤	¤	

	Potentially Significant Impact	Less Than Significant Impact	No Impact
or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?			
c) Conflict with any applicable habitat conservation or natural community conservation plan?	¤	¤	

X. a.): Lowering the VOC content limit of certain coatings at affected facilities will not create divisions in any existing communities because there is no anticipated change to current architectural coating practices. Further, the proposed project does not require construction of any features, such as freeways, that would physically divide an established community.

X. b), c): Architectural coating operations would still be expected to comply, and not interfere, with any applicable land use plans, zoning ordinances, habitat conservation or natural community conservation plans. There are no provisions of the proposed project that would directly affect these plans, policies, or regulations. Land use and other planning considerations are determined by local governments and no present or planned land uses in the region or planning requirements will be altered by the proposed project. No new development or alterations to existing land use designations will occur as a result of the implementation of the proposed amendments. It is not anticipated that existing land uses located in the district would require additional land to continue current operations or require rezoning as a result of implementing PAR 1113. Therefore, no significant adverse impacts affecting existing or future land uses are expected.

Based on the above consideration, significant adverse impacts to land use and planning are not expected from PAR 1113. Since there are no significant adverse impacts, no mitigation measures are required.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
XI. MINERAL RESOURCES. Would the project:			
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	¤	¤	
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	¤	¤	

XI. a), b): There are no provisions of the proposed amended rule that would directly result in the loss of availability of a known mineral resource, such as aggregate, coal, shale, etc. of value to the region and the residents of the state, or of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. The proposed project would lower the VOC content of certain coatings which needs no mineral resource to reformulate.

Based on the above consideration, significant adverse impacts to mineral resources are not expected from PAR 1113. Since there are no significant adverse impacts, no mitigation measures are required.

		Potentially Significant Impact	**Less Than Significant Impact**	**No Impact**
XII.	**NOISE.** Would the project result in:			
a)	Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	¤	¤	
b)	Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	¤	¤	
c)	A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	¤	¤	
d)	A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	¤	¤	
e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	¤	¤	
f)	For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	¤	¤	

XII. a), b), c), d): Excessive generation of noise, excessive groundborne vibration, or substantial increase in ambient noise levels is generally not associated with architectural coating operations. The proposed project is not expected to increase noise levels relative to existing noise levels that are currently generated from the application and use of architectural coatings. Since architectural coating operations are not noise intensive, it is expected that painting contractors would comply with existing relevant local community noise standards and ordinances. In addition to noise generated by coating contractors operations, noise sources from adjacent sources may include nearby freeways, truck traffic to adjacent businesses, and operational noise from adjacent businesses. In general, the primary noise source at existing facilities that use architectural coatings is generated by vehicular traffic, such as trucks transporting raw materials to the facility, trucks hauling wastes away from the facility, trucks to recycle waste or other materials, and miscellaneous noise such as spray equipment (i.e. compressors, spray nozzles) and heavy equipment use (forklifts, trucks, etc.). Noise is generated during operating hours, which generally range from 6 a.m. to 5 p.m. Monday through Friday. PAR 1113 is not expected to alter noise from existing noise generating sources. It is likely that contractor or affected facilities using architectural coatings are operating in compliance with any local noise regulations that may exist in their respective communities. Additionally, the implementation of PAR 1113 is not expected to result in significant noise impacts in residential areas because changing the VOC content will not affect noise levels from coating applications. As with industrial or commercial areas, it is assumed that these areas are subject to local community noise standards. Contractors or do-it-yourselfers applying compliant PAR 1113 coatings in residential areas are expected to comply with local community noise standards. Thus, the lowering of the VOC content limit requirement of affected coating categories would have no additional noise impacts.

XII. e), f): Lowering the VOC content of coatings affected by PAR 1113 is not expected to alter in any way coating operations. As a result, noise levels will either not change as a result of the proposed project and, therefore, will not have an adverse noise impact even if a facility is located near an airport or private airstrip.

Based on the above considerations, significant adverse impacts to noise are not expected from PAR 1113. Since there are no significant adverse impacts, no mitigation measures are required.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
XIII. POPULATION AND HOUSING. Would the project:			
a) Induce substantial growth in an area either directly (for example, by proposing new homes	¤	¤	

	Potentially Significant Impact	Less Than Significant Impact	No Impact
and businesses) or indirectly (e.g. through extension of roads or other infrastructure)?			
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	¤	¤	
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	¤	¤	

XIII. a), b), c): Human population in the SCAQMD's jurisdiction is anticipated to grow regardless of implementing the proposed project. The proposed amendments will primarily affect the formulation of architectural coatings and are not anticipated to generate any significant effects, either direct or indirect on the district's population as no additional workers are anticipated to be required to comply with the proposed amendments. Further, PAR 1113 is not expected to cause a relocation of population within the district. As a result, housing in the district is expected to be unaffected by the proposed amendments. The population will not grow directly as a result of the proposed amended rule and the coating activity will not indirectly induce growth in the area of the coating facilities. The construction of single- or multiple-family housing units would not be required as a result of implementing the proposed project. Therefore, existing housing or populations in the district are not anticipated to be displaced necessitating the construction of replacement housing elsewhere.

Based on the above considerations, significant adverse impacts to population and housing are not expected from PAR 1113. Since there are no significant adverse impacts, no mitigation measures are required.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
XIV. PUBLIC SERVICES. Would the proposal result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:			

a) Fire protection?	¤	¤
b) Police protection?	¤	¤
c) Schools?	¤	¤
d) Parks?	¤	¤
e) Other public facilities?	¤	¤

XIV. a), b): The proposed amendments will not substantially increase the amount of businesses or equipment in the district. Reformulation of coatings is not expected to require new or additional fire fighting resources or police protection. In fact, PAR 1113 may actually result in fewer impacts to public service agencies because compliant coatings are expected to be formulated with less hazardous materials compared to current coatings. Any increase in accidental releases of compliant coating materials would be expected to result in a concurrent reduction in the number of accidental releases of existing coating materials. As a result, the net number of accidental releases would be expected to remain constant, allowing for population growth in the district. Additionally, future compliant coating materials are not expected to cause significant adverse human health impacts, so accidental release scenarios would be expected to pose a lower risk to the public and responding fire and police departments. Furthermore, if manufactures continue to use solvents such as texanol, propylene glycol, ethylene glycol, etc., in their compliant water-borne coatings, fire departments would not be expected to experience adverse impacts because in general these solvents are less flammable solvents and, therefore, create fewer emergency incidents. Demands on public service systems are not expected to increase and impacts to these systems are, therefore, not considered to be significant because any potential increase in the use of flammable substances, such as acetone, are expected to be minor and, as a result, are not expected to be adversely affect performance objectives, service ratios, response times, etc.

XIV. c), d): Because coating operations are not expected to change, contractor operations or affected facilities are not expected to require new employees. As noted in item "XIII. Population and Housing," the proposed project will not increase population growth in the district. Consequently, no new impacts to schools, parks or other recreational facilities are foreseen as a result of implementing the proposed amendments to Rule 1113.

XIV. e): The proposal would not result in the need for new or physically altered government facilities in order to maintain acceptable service ratios, response times or other performance objectives.

Based on the above considerations, significant adverse impacts to public services are not expected from PAR 1113. Since there are no significant adverse impacts, no mitigation measures are required.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
XV. RECREATION.			
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.?	¤	¤	
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	¤	¤	

XV. a), b): The proposed amendments will not generate additional demand for, or otherwise affect land used for recreational purposes. The proposed amendments are not expected to have adverse affects on land uses in general. As discussed under "Land Use and Planning" above, there are no provisions in the proposed project that would affect land use plans, policies or ordinances, or regulations. Land use and other planning considerations are determined by local governments; no land use or planning requirements will be altered by the proposal. As already noted in item "XIII, Population and Housing", the proposed project is not expected to increase population growth in the district because no additional employees would be required to apply lower VOC coatings so no additional demand for parks is anticipated. Further, the proposed amendments would not increase the use of existing neighborhood and regional parks or other recreational facilities or include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

Based on the above considerations, significant adverse impacts to recreation are not expected from PAR 1113. Since there are no significant adverse impacts, no mitigation measures are required.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
XVI. SOLID/HAZARDOUS WASTE. Would the project:			
a) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	¤	¤	
b) Comply with federal, state, and local statutes and regulations related to solid and hazardous waste?	¤	¤	

XVI. a), b): Coating operations are not expected to change as a result of the proposed amendments. Similarly, the volume of coatings and coating wastes is not expected to increase as a result of implementing PAR 1113. Therefore, no new solid or hazardous waste will be generated as a result of lowering the VOC content limit of certain coatings in Rule 1113. Affected facilities would continue to complying with federal, state, and local statutes and regulations related to solid and hazardous waste handling and disposal. Therefore, potential solid waste impacts are considered not significant.

Based on the above consideration, significant adverse impacts to solid/hazardous waste are not expected from PAR 1113. Since there are no significant adverse impacts, no mitigation measures are required.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
XVII. TRANSPORTATION/CIRCULATION Would the project:			
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	¤	¤	
b) Exceed, either individually or cumulatively, a	¤	¤	

	level of service standard established by the county congestion management agency for designated roads or highways?		
c)	Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	¤	¤
d)	Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?	¤	¤
e)	Result in inadequate emergency access?	¤	¤
f)	Result in inadequate parking capacity?	¤	¤
g)	Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g. bus turnouts, bicycle racks)?	¤	¤

XVII. a), b), f): PAR 1113 is not expected to alter affected coating operations so no additional transportation/circulation impacts are expected to occur directly or indirectly as a result of lowering the VOC content limit of certain coatings in Rule 1113. As noted in item XIII, Population and Housing, no new employees are expected to be needed at affected facilities and therefore no new worker trips that could increase traffic or affect in any way the level of service designation for any roadways will result from the proposed amendments. Similarly, additional parking would not be required from implementing PAR 1113. Because affected coating operations are not expected to change, no new or additional raw materials will be needed and, therefore, no transport trips that could affect the level of service for roadways will be generated from the continued operation of the coating activity.

XVII. c): Air traffic patterns are not expected to be directly or indirectly affected by the proposed amended rule because the coating activity will not require any air transportation of any materials. Since PAR 1113 willnot require transport of materials by air, no increase in any safety risks are expected.

XVII. d), e): The proposed amendments to Rule 1113 does not have direct or indirect impact on specific construction design because the proposed project does not require or induce the construction of roadway design features. PAR 1113 simply lowers the VOC content limit of certain coatings, so it is expected that the architectural coating operation would not change.

XVII. g): Affected facilities would still be expected to comply with, and not interfere with adopted policies, plans, or programs supporting alternative transportation. The lowering of the VOC content limit of certain coatings in Rule 1113 will not hinder compliance with any applicable alternative transportation plans or policies.

Based on the above considerations, significant adverse impacts to transportation/circulation are not expected from PAR 1113. Since there are no significant adverse impacts, no mitigation measures are required.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE.			
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	¤	¤	
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)	¤	¤	
c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	¤	¤	

XVIII. a): As discussed in items I through XVII above, the proposed amended rule has no potential to cause significant adverse environmental effects because it would a result in lowering the VOC content limit of certain coatings in Rule 1113. Therefore, the proposed project is not expected to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal. Similarly, PAR 1113 would not eliminate important examples of the major periods of California history or prehistory or otherwise degrade cultural resources.

XVIII.b) Based on the foregoing analyses, since PAR 1113 will not result in project-specific significant environmental impacts and indeed will reduce emissions, PAR 1113 is not expected to cause cumulative impacts in conjunction with other projects that may occur concurrently with or subsequent to the proposed project. Cumulative air quality impacts from the proposed amendments, PAR 1171, previous amendments and all other AQMP control measures considered together are not expected to be significant because implementation of all AQMP control measures is expected to result in net emission reductions and overall air quality improvement. As described in Chapter 1, there is little overlap between the proposed amendments for Rules 1171 and 1113. Where effects do overlap, the effects are typically beneficial. Furthermore, PAR 1113 impacts will not be "cumulatively considerable" because the incremental impacts are not considerable when viewed in connection with the effects of past, current, or probable future projects.

XVIII.c) Based on the foregoing analyses, PAR 1113 is not expected to cause significant adverse effects on human beings, either directly, or indirectly.

APPENDIX A

PROPOSED AMENDED RULE 1113

– ARCHITECTURAL COATINGS

In order to save space and avoid repetition, please refer to the latest versions of the proposed amended Rule 1113 located elsewhere in the rule package. The "Version C" of the proposed amended rule was circulated with the Draft EA that was released on September 25, 2003 for a 30-day public review and comment period ending October 24, 2003.

Original hard copies of the Draft EA, which include the "Version C" of the proposed amended rule, can be obtained through the SCAQMD Public Information Center at the Diamond Bar headquarters or by calling (909) 396-2039.