BOARD MEETING DATE: February 3, 2006 AGENDA NO. 36

(Continued from January 6, 2006 Board Meeting)

PROPOSAL: Annual Status Report on Rule 1113 – Architectural Coatings

SYNOPSIS: This final report for 2005 updates technical information provided in a draft report presented to the Board in June 2005 and presents results of additional laboratory testing, field surveys and site visits. Conclusions are drawn relative to the achievability of the 2006 limits contained in Rule 1113. The report also discusses compliance actions and additional meetings held with the Technical Advisory Committee, Rule 1113 Ad Hoc Subcommittee and various coating manufacturers. Several changes have been made to this report to correct minor errors and to update information relative to the Board's decision to continue this matter to the February, 2006 meeting.

COMMITTEE: Stationary Source, December 21, 2005, Reviewed

RECOMMENDED ACTION:
Receive and file.

Barry R. Wallerstein, D.Env.
Executive Officer

EC:LT:LL:DB

Background

On August 13, 1999, the Board approved a workplan that required submittal of annual status reports summarizing issues and activities regarding the implementation of Rule 1113-Architectural Coatings. The first report, submitted on July 21, 2000, has been followed each year by new information on the implementation of future effective volatile organic compound (VOC) limits in the rule. In addition to rule requirements for technology assessments of specific coating categories, a Board-approved resolution in December of 2002 focused subsequent reports on progress

toward achieving the 2006 VOC limits found in the rule. This is the sixth such report that staff will have presented to the Board. A draft of this report was presented to the Stationary Source Committee in June and was summarized as part of the committee's minutes submitted at the July Governing Board meeting.

In preparing this report, staff has received input from the Technical Advisory Committee (TAC) and the Ad Hoc Committee established in 2005 by Governing Board Chairman Dr. William Burke. The TAC includes representatives of several manufacturing companies, the National Paints and Coatings Association, CARB, a consulting and engineering firm, a painting contractor and several members from academia. As mentioned in previous annual reports to the Board, the TAC is an important committee that staff relies upon for technical expertise and valuable feedback on all aspects of architectural coatings. The Ad Hoc Committee was formed for the purpose of providing an open forum to discuss key regulatory issues relative to the coatings industry and improving communication between AQMD and industry to resolve current and future regulatory issues in a non-litigious manner. The Committee is comprised of AQMD Board Members Michael Antonovich and Jan Perry, AQMD management representatives Dr. Barry Wallerstein and Dr. Laki Tisopulos, and industry representatives Christine Stanley of Ameron and Ron Widner of Benjamin Moore and Co.

AQMD staff continues to assess the significance of emissions contributing to ozone formation in the South Coast Air Basin (Basin) from VOCs attributable to architectural coatings and these coatings continue to be a critical component for attainment of Federal and State standards. The latest CARB architectural coating survey, for year 2000 sales, shows more than 50 tons per day of VOCs are attributed to the application of architectural coatings in the Basin based on demographics. After implementation of Rule 1113's lower VOC limits effective in 2001 and 2003, the 2003 Air Quality Management Plan (AQMP) estimates the remaining architectural coating VOC inventory at 38.36 tons per day in 2005.

Technology Assessment

Many significant achievements have been made by raw material suppliers and coating formulators in the production of quality compliant products meeting the July 1, 2006 limits. This represents a strong industry commitment and the effort is commendable. Many products are currently available that meet the July 1, 2006 limits in the rule. In fact, staff's research shows an ever-increasing number of products already available in the market that meet and exceed the 2006 limits. These products also meet the performance demands of industrial and consumer applicators based on field observations of applied materials.

Staff relied on a number of key sources of data and information for determining the availability and performance of coatings. These include:

1. **CARB Survey**. When comparing the data from previous CARB surveys, this most recent sales data provided by the coating manufacturers indicates an increase in the overall sales volume of lower VOC products in many categories that meet the AQMD's proposed future limits.
2. **Compliant Products Found in Web-Based Searches**. Staff found compliant and super-compliant coatings listed by large and small manufacturers on their websites in all 11 coating categories with lower VOC limits that take effect on July 1, 2006. Staff verified product characteristics by examining Technical Data Sheets and Material Safety Data Sheets for each coating listed. (See Table 4 on page 8 of the report and Appendix A.)
3. **Field Visits to New Construction Sites.** Staff visited more than 100 new construction sites in 2004 and 2005 in order to determine what products the contractors are using and whether they are working. Overall, most of the construction sites visited had applied architectural coatings that are much lower than the current specified limits in many different categories and had used many super-compliant products that meet the future limits in Rule 1113. Even with the super compliant products, all of the contractors indicated that they were satisfied with their performance. (See Table 5 on page 11 of the report.)
4. **Performance Studies by Public Service Agencies.** Various public service agencies have completed testing of low-VOC industrial maintenance coatings in recent years and have found compliant products with acceptable performance. Some ~~Public Service Agencies and~~ industrial coating manufacturers, however, have commented that exempting tertiary butyl acetate (TBAc) as a VOC would provide manufacturers with additional flexibility in formulating products with exceptionally long durability.
5. **Meetings with Local Manufacturers (Large and Small).** Staff visited local paint manufacturers individually to inquire about their successes and failures in preparing for the upcoming deadlines for July 2006. With several key exceptions detailed in the report, these manufacturers indicated that complaint products were available and that they exhibited acceptable performance for their markets. Staff concluded that most manufacturers were ready to market compliant products in all but 3 coating categories and staff is proposing amendments to Rule 1113 to allow additional time and flexibility to allow for product development.
6. **Point of Distribution Product Inventory Survey.** Staff conducted a survey of local store inventories in the Spring of 2004. The primary purpose of the survey was to obtain a snapshot of the currently available architectural products being sold from store shelves. A secondary benefit of the survey was to alert store owners to the rule requirements. This

limited survey indicates that products meeting the 2006 VOC limits for many categories are currently available and being sold to consumers.

7. **Review of Select Technical Papers and Articles on Advancements in the Coatings Industry.** Manufacturers of coatings rely heavily on the research and development efforts of the raw materials suppliers. Successful reformulation by individual coating companies requires different resins and additives. The annual status report provides excerpts from these articles that overwhelmingly indicate that there are ongoing technological achievements to support compliant product formulation. Papers presented at the recent Western Coatings Society Symposium and Show indicate the availability and support from resin and additive suppliers of low-VOC components that meet and exceed the future VOC limits in Rule 1113 and expected performance characteristics as compared to traditional higher VOC containing materials.
8. **AQMD Contracted Performance Studies.** Staff has contracted with industry experts to conduct laboratory studies to assess the performance characteristics of the low-VOC products and determine whether these characteristics are compromised through reformulation. A review of these studies supports staff conclusions that overall super compliant coatings meet or exceed expected characteristic performance standards when compared to products that have much higher VOC content.

   The overall results of the recent architectural coatings laboratory evaluation by the University of Missouri at Rolla, continues to support staff's conclusions. In all instances and with the exception of the high gloss non-flats category, commercially available products that meet the 2006 limits listed in the Table of Standards for Rule 1113 have performance characteristics that are similar to and in many cases better than their higher-VOC counterparts. The results of the findings are summarized in the report, (see pages 32-36), with the empirical data available for review in Appendix C.
9. **Studies of Alternate Means of Compliance Provided by the Rule.** By examining the number of manufacturers who have taken advantage of alternate means of compliance allowed by the rule, staff has concluded that these flexibilities in the rule have allowed manufacturers additional time for product reformulation. These alternate methods include the averaging compliance and sell-through options as well as the small container exemption.

Key Issues

At the Ad Hoc Board Committee's first meeting on July 8, 2005, the National Paints and Coatings Association (NPCA) recognized the extreme air quality needs of the region and suggested that they were ready to propose a new structure for the rule that

would achieve the same overall VOC emission reductions while providing the industry flexibility to meet future limits. NPCA represented that its proposals would be "emissions neutral," or in other words, offset any loss in air pollution reductions. AQMD representatives welcomed the suggestion and invited NPCA to submit its proposal.

Staff received three proposals from NPCA for manufacturers to make the transition to the future VOC limits. Unfortunately, none of the proposals met the "emissions neutral" standard.

The first proposal was to rollback the VOC limits for all coating categories in conjunction with ARB's suggested Statewide Control Measures (SCM) with no other changes. Staff calculated that would result in a loss of 14 tons of VOC emissions. NPCA also suggested that the lost VOC emissions could be recovered voluntarily by industry through "over-compliance." The District does not support this proposal since the District is legally required to have enforceable means of attaining emission reductions. This proposal would allude to unenforceable voluntary efforts.

The second proposal was the rollback of most but not all future VOC limits and offsetting lower emission limits for four other coating categories. Staff has calculated that this proposal would result in 6 tons of lost VOC emissions. In addition, staff also calculated that using the four coating categories to offset the 6 lost tons of VOC emissions actually amounted to just 0.8 tons of VOC emissions.

The third proposal was to postpone all future VOC limits for all categories for periods of one to four years with no offsetting reductions. Staff has calculated that this method would result in 13 tons per day of lost VOC emissions.

The District staff does not support the three NPCA proposals for two reasons. Staff has determined that none of the three proposals meet an "emission neutral" standard and many compliant coatings have already been identified for the categories that are available in the market and have been performing as well as and in some cases better than the higher-VOC counterparts.

Conclusions and Recommendations

As detailed in this report, AQMD staff's research of technical information from many coating manufacturers, coating studies, assessments of sales data, marketing brochures, Material Safety Data Sheets and other sources clearly shows an ever-increasing number and volume of products that perform well and meet the future proposed limits.

However, as mentioned earlier, there are limited areas in high-gloss coatings where transitioning to the 2006 limits continues to be especially challenging for many

manufacturers. While the recent improvements in the resin and raw material technology appear to address the product performance related challenges in high-gloss coatings, incorporation of the new technologies by July 1, 2006 continues to be a challenge for many manufacturers. Staff is therefore proposing specific rule amendments to allow additional time for manufacturers to take advantage of the latest improvements in resin and raw material technology for developing compliant products for non-flat high gloss coatings and quick dry (high-gloss) enamels.

AQMD staff also recognizes that there may be a lack of industrial maintenance atmospheric coatings available that meet certain rigorous standards desired by essential public service agencies such as the Metropolitan Water District (MWD). Typical industrial maintenance coatings (IMC) are expected to have a 7 year longevity, whereas, the MWD desires an IMC to last at least 15 years. The MWD has completed testing of some atmospheric IMCs with Tertiary-Butyl Acetate (TBAc), a solvent that they are extremely optimistic about. EPA and CARB have determined TBAc to be VOC exempt. AQMD staff agrees that TBAc has low photochemical reactivity and understands that TBAc is a desirable solvent from the formulator's standpoint. Many IMC manufacturers and the MWD are seeking the District to delist TBAc as a VOC (i.e. consider TBAc an exempt compound) for use in coatings critical to the support of the public infrastructure. Staff is proposing to evaluate the partial delisting of TBAc for certain industrial maintenance coatings.

Consistent with the conclusions found in this annual report, staff recommends the following:

Amend Rule 1113 during the first quarter of 2006 to establish a new category for non-flat high gloss coatings with an interim VOC limit of 150 g/l effective on July 1, 2006 and a final limit of 50 g/l effective on July 1, 2007. This will allow additional time for development of compliant coatings for this special category of non-flat coatings. It is expected that by July 1, 2007, all manufacturers will be able to employ the latest technology to meet this limit. For the companion category of quick dry enamels, extend the final compliance date by one year to July 1, 2007 and establish an interim VOC limit of 150 g/l for July 1, 2006. Quick dry enamels are a companion category to non-flat high gloss. They utilize the same technology and therefore the manufacturers need additional time for development of adequately performing coatings.

As part of the rule development process, evaluate the partial delisting of tertiary butyl acetate (TBAc) for certain industrial maintenance coatings. TBAc is a solvent exempted under state and federal regulations. Staff evaluation will address toxicity concerns as well as air quality benefits that could result from such a de-listing. The use of this exempt solvent will provide manufacturers with the additional flexibility in reformulating products

with exceptional performance characteristics while meeting the effective rule VOC limitation of 100 g/l by July 1, 2006.

Finally, in an effort to offset the emission reduction impacts of the above proposals, staff is also proposing that the Board consider tightening or accelerating the VOC limits for several categories where low-VOC compliant products are available (i.e. bond breakers, concrete curing compounds, dry fog coatings, traffic coatings).

Anticipating an April 2006 public hearing on these proposals, staff has held the first Rule 1113 public workshop on January 26, 2006 to seek public comment. Staff will report back to the Board, in the form of an annual report, in December 2006.

Attachments

A. Key Contacts

B. Annual Status Report on Rule 1113- Architectural Coatings

ATTACHMENT A

KEY CONTACTS LIST

KEY CONTACTS LIST	
Kevin R. Merlo	Air Products Polymers
Christine Stanley	Ameron Protective Coatings Systems
John Woods	Ameron Protective Coatings Systems
Norm Mowrer	Ameron Protective Coatings Systems
Brian Turk	BASF
Kathy Allen	Bayer Material Science
Michael Butler	BEHR Process Corporation
Parker Pace	BEHR Process Corporation
Kip Cleverly	Benjamin Moore Paints
Barry Jenkin	Benjamin Moore Paints
Ron Widner	Benjamin Moore Paints
Gerald Thompson	BonaKemi USA, Inc.
Dane Jones, Ph.D.	Cal Poly, SLO
Max Wills, Ph.D.	Cal Poly, SLO
Andy Rogerson	Caltrans
Monique Davis	CARB
Jim Nyarady	CARB
Barry Barman	CSI Services, Inc.
Bud Jenkins	CSU Pomona
Charles Milner Ph.D.	CSU Pomona
Dennis St. Laurent	CYTEC
Lloyd Haanstra	Deft Coatings
Randall J, Brady	Deft Coatings
Marc N. Hiraoka	Disneyland Resort
Michael Van Leeuwen	Disneyland Resort
Michael G. Rose	Dunn-Edwards Paints
Robert Wendoll	Dunn-Edwards Paints
Kevin McCreight	Eastman Chemical Company
Ronald J. Regan	Eastman Chemical Company
Joseph Tashjian	Ellis Paint Company
Howard Berman	Environmental Mediation, Inc.
Robert Henderson	EPMAR
Dave/Adam Fuhr	Fuhr International
Richard Hart	Hart Polymers
Jim Kantola	ICI Dulux Sinclair
Jeffrey P. Mulford	Lifeguard
David Sibbrel	Life Paint Company
Daniel B. Pourreau, Ph.D	Lyondell

KEY CONTACTS LIST, CONT'D	
Bob Coleman	Merecole, Inc.
Raymond Russell	Morwear Paint Co.
Stephen Murphy	Murphy Industrial Coatings
Carol Yip Kaufman	MWD
John Wallace	MWD
David Darling	National Paint & Coatings Association
Bob Nelson	National Paint & Coatings Association
Michelle Richards	NBC Universal
Tony Olson	NBC Universal
Dinkar Naik	Pacific Polymers
Robert Gross	PPG Industries, Inc.
Claude Florent	Rainguard
Aqua Mix	Real Bourdage
Brough Richey, Ph.D.	Rohm and Hass Company
Clare Doyle	Rohm and Hass Company
William H. Hill	Rohm and Hass Company
Ben McCall	SDA Craft Technologies
Jason Jones	Sherwin-Williams Company
Madelyn Harding	Sherwin-Williams Company
Albert G. Silverton	Silvertown Products, inc.
Darin A. Shields	Specialty Polymers, Inc.
Kevin Worrall	Texture Coatings of America, Inc.
Tony Hobbs	Tnemec Corporation
Kathryn Sheppard	UMR Coatings Institute
Michael R. Van De Mark, Ph.D.	UMR Coatings Institute
Don Sudduth	UV Chemistry Company, Inc
Duncan Gamble	UV Chemistry Company, Inc.
Hamid Pourshirazi	Vista Paint
Jerome Fischer	Vista Paint
John Long	Vista Paint

ATTACHMENT B

ANNUAL STATUS REPORT ON RULE 1113 – ARCHITECTURAL COATINGS

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

ANNUAL STATUS REPORT ON RULE 1113 – ARCHITECTURAL COATINGS

Dated: January 6, 2006

Deputy Executive Officer
Planning, Rule Development, and Area Sources
Elaine Chang, DrPH

Assistant Deputy Executive Officer
Planning, Rule Development, and Area Sources
Laki Tisopulos, Ph.D., P.E.

Planning and Rules Director, Area Sources
Planning, Rule Development, and Area Sources
Lee Lockie

Author:	David De Boer	Senior Staff Specialist
Reviewed by:	Frances Keeler	Senior Deputy AQMD Counsel
	William Wong	Senior Deputy AQMD Counsel
	Naveen Berry	Program Supervisor
Contributors	Dan Russell	Air Quality Specialist
	Don Hopps	Air Quality Inspector III

SOUTH COAST AIR QUALITY MANAGEMENT AQMD

GOVERNING BOARD

Chair: WILLIAM A. BURKE, Ed.D.
Speaker of the Assembly Appointee

Vice Chair: S. ROY WILSON, Ed.D.
Supervisor, Fourth District
Riverside County Representative

MEMBERS:

MICHAEL D. ANTONOVICH
Supervisor, Fifth District
Los Angeles County Representative

JANE W. CARNEY
Senate Rules Committee Appointee

BEATRICE J. S. LAPISTO-KIRTLEY
Mayor, City of Bradbury
Cities Representative, Los Angeles County/Eastern Region

RONALD O. LOVERIDGE
Mayor, City of Riverside
Cities Representative, Riverside County

GARY OVITT
Supervisor, Fourth District
San Bernardino County Representative

JAN PERRY
Councilmember, 9th District
Cities Representative, Los Angeles County, Western Region

MIGUEL PULIDO
Mayor, City of Santa Ana
Cities Representative, Orange County

JAMES SILVA
Supervisor, Second District
Orange County Representative

CYNTHIA VERDUGO–PERALTA
Governor's Appointee

DENNIS YATES
Mayor, City of Chino
Cities Representative, San Bernardino County

EXECUTIVE OFFICER

BARRY R. WALLERSTEIN, D.Env.

TABLE OF CONTENTS

TABLE OF CONTENTS CONT'D

TABLE OF CONTENTS CONT'D

Page

TABLES and GRAPHS:

Purpose of this Report

This report is the sixth annual progress report prepared in accordance with the 1999 Board-approved Work Plan for Implementation of Rule 1113 – Architectural Coatings. It reports on progress toward achieving compliant products with respect to the coating categories subject to the July 1, 2006 limits in the rule, including:

- Information on the ever increasing number of compliant and super-compliant products already available in the market;
- Summary of select articles on the latest resin and low-volatile organic compound (VOC) product technologies;
- Compliance status report relative to existing limits;
- Past and current laboratory and product development studies;
- Progress on the Reactivity and Availability assessment of solvents found in architectural coatings, and
- Recommendations based on the Technology Assessment Results.

As part of its technology assessment, the South Coast Air Quality Management District (AQMD) contracted with the University of Missouri – Rolla Coatings Institute (UMR) to conduct a laboratory study of architectural coatings in certain coating categories identified in the rule. This report incorporates the results of the testing and staff's conclusions and recommendations for public review.

Background

On August 13, 1999, the Board approved a workplan that required submittal of annual status reports summarizing issues and activities regarding the implementation of Rule 1113-Architectural Coatings. The first report, submitted on July 21, 2000 has been followed each year by new information on the implementation of future volatile organic compound (VOC) limits in the rule. In addition to rule requirements for technology assessments of specific coating categories, a Board approved resolution in December of 2002, ensured the continuance of annual reports with a focus on the progress towards achieving the 2006 VOC limits found in the rule. This is the sixth such report that staff will have presented to the Board. A draft of this report was presented to the Stationary Source Committee in June and was summarized as part of the committee's minutes presented at the July Governing Board meeting.

As mentioned in previous annual reports to the Board, the Technical Advisory Committee (TAC) is an important committee that staff relies upon for technical expertise and valuable feedback on all aspects of architectural coatings. The TAC was first formed in February 1998 to provide technical oversight of the Phase II Assessment Study and future technology assessments, including selection of coatings, relevant testing, and the report formats. The TAC also evaluates data to identify links between performance characteristics and the emission potential of architectural coatings, as well as helping

staff in designing a performance ranking system for future technology assessments. The current makeup of the TAC includes representatives of several large and small manufacturing companies, the CARB, the National Paint and Coatings Association, a consulting and engineering firm, a painting contractor and several members from academia.

AQMD staff continues to assess the significance of emissions contributing to ozone formation in the South Coast Air Basin (Basin) from volatile organic compounds (VOCs) attributable to architectural coatings and these coatings continue to be a critical component for attainment of Federal and State standards. The latest California Air Resources Board (CARB) architectural coating survey for year 2000 sales, show more than 50 tons per day of VOCs are attributed to the application of architectural coatings in the Basin based on demographics. After implementation of Rule 1113's lower VOC limits effective in 2001 and 2003, the 2003 Air Quality Management Plan (AQMP) estimates the remaining architectural coating VOC inventory at 38.36 tons per day in 2005.

Annual Progress Report

The intent of this annual report is to provide the latest information on the availability and performance of architectural coatings subject to current and future compliance limits. The results of surveys, web-based data searches, laboratory testing and evaluation of coatings, in-situ coating performance and available compliance options built into the rule are some of the topics covered in this report. The information contained in this report includes the following:

- Technical information from technical data sheets (TDS), Material Safety Data Sheets (MSDS), technical papers, and Original Equipment Manufacturer (OEM) brochures that demonstrate that VOC products meeting the future VOC limits are in use and available to all consumers.
- Product surveys, compliance inspections/audits and ongoing laboratory testing continue to show an increase in the use and application of compliant and super-compliant coatings meeting the 2006 and other future VOC limits in Rule 1113 for all categories.
- Recommendations on areas where performance is not yet confirmed.

Future Program Activities and Studies

AQMD staff is committed to continue researching all coating categories for additional products that show compliance with current and future rule limits. As the 2006 limits approach, more coatings are becoming available in all categories and the successful, voluntary use of available low-VOC technology is evidence that the coatings are performing at or above industry expectations. Discussions with the TAC continue and staff has asked them to provide a list of coatings that they would like included in potential future assessments.

In addition to the TAC, in early 2005, at the request of Governing Board Chairman William Burke, an ad hoc committee was formed for the purpose of providing an open forum to discuss key regulatory issues relative to the coatings industry . This committee is made up of AQMD Board Members Michael Antonovich and Jan Perry, AQMD Management representatives Dr. Barry Wallerstein and Dr. Laki Tisopulos, and industry representatives Christine Stanley of Ameron and Ron Widner of Benjamin Moore. Steve Sanchez of U.S. Can Company is an industry alternate. This ad hoc committee has had several meetings to date, and the AQMD is dedicated to continuing the open dialogue with the other members. Periodic updates will be given to the Board's Stationary Source Committee.

As technology improves and VOCs in all categories get closer to zero, staff will continue to research the feasibility of further reductions in the VOC content of all architectural coating categories as currently listed in the Table of Standards for Rule 1113.

Availability and Performance of Compliant Coatings

CARB Survey

Rule 1113 requires AQMD technology assessments to consider any applicable CARB surveys on architectural coatings. Approximately every four or five years since 1976, CARB has conducted architectural coating surveys. The survey methodology serves as a tool to obtain information such as VOC content and sales volume of coatings from manufacturers that offer products for sale in California. Data obtained for 2000 represents the latest information available that gives a comprehensive evaluation of sales data and coating chemistries supplied from manufacturers. Although, in 2005, CARB conducted its most recent survey to compile information based on 2004 sales information provided by manufacturers, the preliminary results of the survey will not be available until spring of 2006.

The sales data obtained for 2000 separates architectural coatings statewide into 51 categories, identifying more than 98 million gallons of architectural coatings sold in California in 2000, with 83 percent of that volume coming from waterborne products and the remainder from solvent-based coatings. However, waterborne products contributed to only 41 percent of the total emissions, while the solvent-based products contributed to 59 percent of the total emissions. The sales of architectural coatings in the AQMD are based on an estimated population representing 45 percent of all coatings sold statewide. Table 1 below summarizes the use and contribution of waterborne and solvent-based coatings from the most recent CARB survey.

Table 1
CARB Survey - California

	Waterborne	Solvent-Based
Total Volume (%)	83	17
Total Emissions (%)	41	59
Annual Volume (Gal/Yr)	81,548,961	16,906,211

Table 2 below summarizes information extrapolated from the 2000 sales data for the CARB 2001 Architectural Coatings Survey, listing the total number of products, sales volume, as well as number and percent of products, and percent volume of sales that currently meet the future Rule 1113 VOC limits for categories with future limits (excludes quart containers or smaller).

Table 2
CARB 2001 Survey Results - California

Coating Category	Total Products Listed	Total 2000 Sales Volume (gallons)	# of Products Meeting Future VOC Limits	Sales Volume meeting Future VOC Limits	% of Products Meeting Future VOC Limits	% of Sales Meeting Future VOC Limits
Flats	3,514	34,405,612	367	2,839,654	10%	8%
Floor	715	1,403,122	111	688,922	16%	49%
Industrial Maintenance	3,751	4,527,107	312	517,868	8%	11%
Non-flats						
High-gloss	842	1,781,198	1	944	0%	0%
Med-Gloss	2569	17,468,318	75	102,741	3%	1%
Low-gloss	1375	6,449,909	77	218,113	6%	3%
Primers, Sealers, & Undercoaters (PSU)	905	7,941,252	283	2,626,489	31%	33%
Quick-Dry PSU*	121	1,611,339	3	39,442	2%	2%
Rust Preventative**	81	180,522	3	1,047	4%	1%
Exterior Stains	1,315	2,741,425	126	313,266	10%	11%
Varnishes	427	664,414	87	236,557	20%	36%
Water Proofing Sealers	234	1,006,632	76	256,122	32%	25%
Water Proofing Concrete/Masonry Sealers	127	700,028	61	285,206	48%	41%

*- Subsumed into the PSU Category
**- New category in 2000; previously reported as non-flat, QDE, and light industrial coatings

When comparing the data from previous CARB surveys, this most recent sales information provided by coating manufacturers indicates an increase in the overall sales volume of lower VOC products in many categories that meet the AQMDs proposed future limits. CARB is currently compiling 2004 sales data for the CARB 2005 Architectural Coatings Survey that should be available sometime in 2006. Based on trends from previous surveys, staff anticipates an increase in waterborne sales for 2004 sales data.

Using the data from the surveys every four years, CARB has calculated the associated emissions. Table 3 contains summary data from these surveys. Please note that the surveys have varied in content and format. Therefore, it is not always possible to make a direct comparison between results from different survey years.

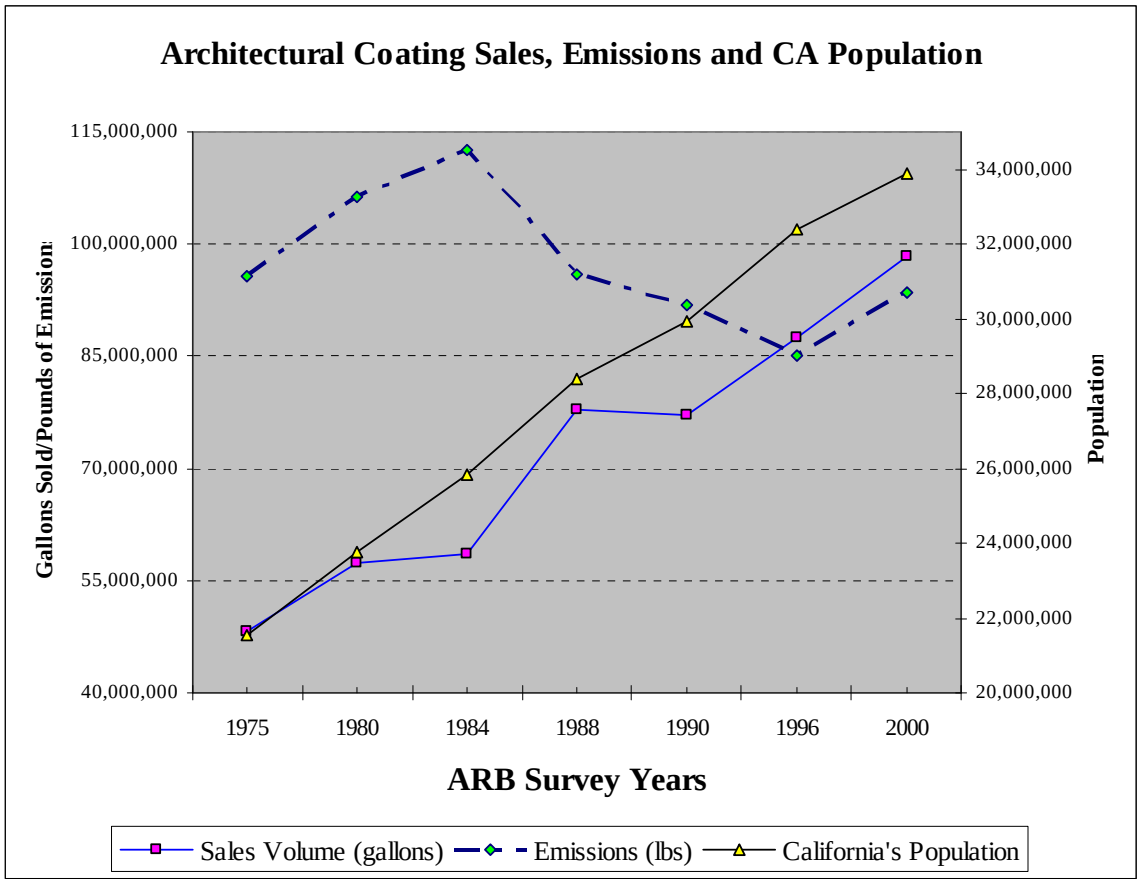
Table 3
CARB Architectural Coatings Volume and Emissions Trends

Survey Year	Sales Volume (gallons)	Emissions (lbs)	California's Population	Pounds of VOC Emissions per capita	# of Surveys Mailed Out	# of Companies Reporting Sales
1975	48,206,000	95,776,000	21,538,000	4.4	N/A	N/A
1980	57,247,000	106,211,000	23,782,000	4.5	N/A	N/A
1984	58,481,000	112,532,000	25,816,000	4.4	~400	143
1988	77,876,000	96,056,000	28,393,000	3.4	N/A	130
1990	77,056,000	91,842,000	29,944,000	3.1	N/A	174
1996	87,496,000	85,142,000	32,383,000	2.6	>700	152
2000	98,455,172	93,629,000	33,871,648	2.8	700	183

Emissions include emissions from thinning and cleanup solvents; also reflects economic recession trends.
N/A = Not Available

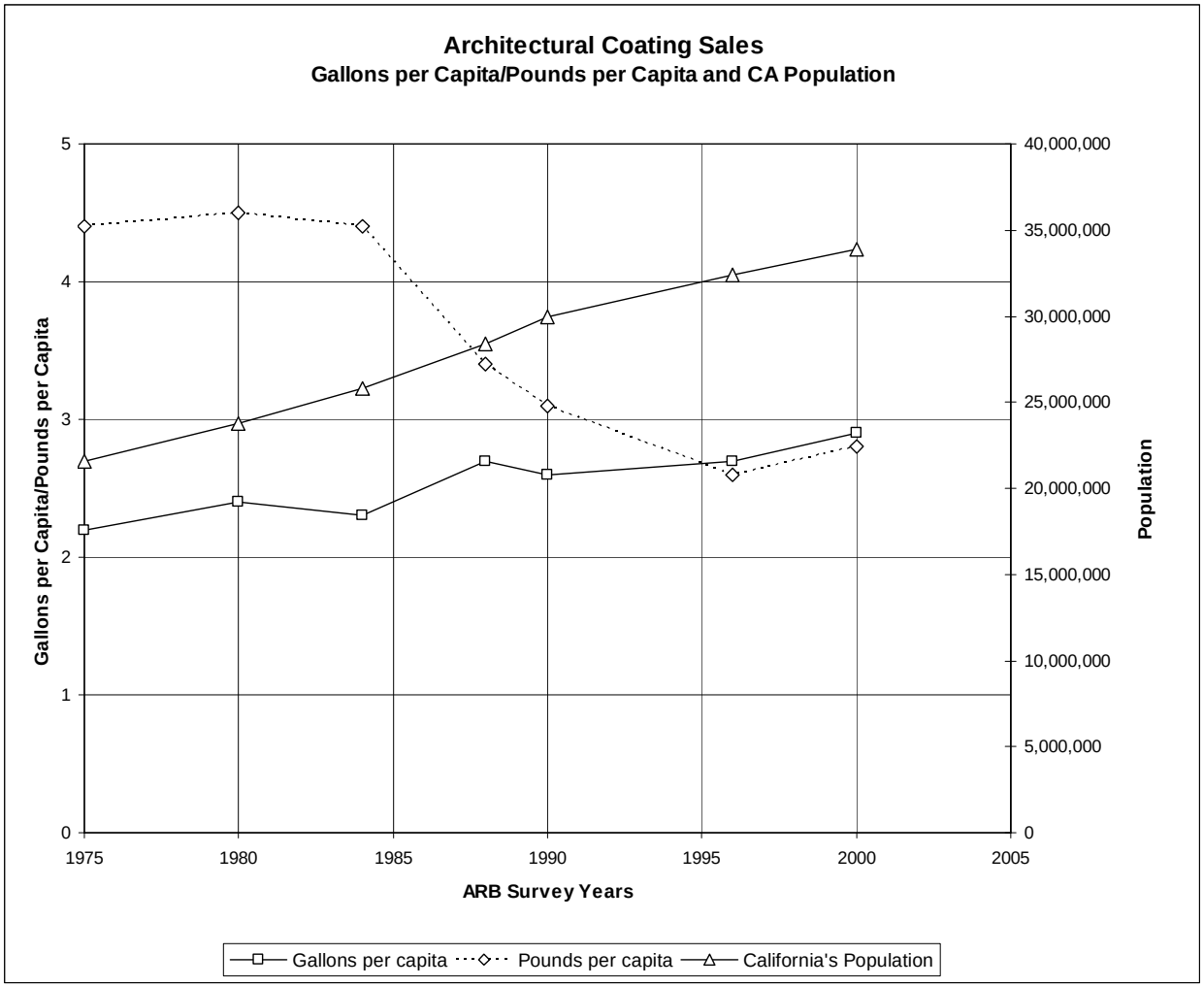
Graph 1 details the trends shown in Table 3, specifically sales volume, emissions and California's population.

Graph 1



In summary, the chart shows that while California's population and sales volume of coatings grew significantly over the last 25 years, statewide VOC regulations requiring lower VOC limits have managed to keep the emissions from architectural coatings slightly lower than the 1975 emission levels. Regulations began having an effect on architectural coating emissions by 1984. Emissions continued to decline through the real estate recession until 1996, reflecting the real estate recession and resumed their increase from that point until 2000. Graph 2 further demonstrates, that based on the data provided in Table 3 although sales volumes show a marked increase over the years, the pounds of emissions per capita continued to decline until the recession was over and then indicates only a slight increase. Most of the state regulatory action after 1996 should begin to show some effect on emissions after 2000. The CARB 2005 Architectural Coatings Survey will contain 2004 sales and emission data.

Graph 2



Specific Coating Category Assessments by AQMD Staff

Rule 1113 requires lower VOC limits effective July 1, 2006, for the following categories:

- Clear Wood Finishes
- Floor Coatings
- Industrial Maintenance Coatings (IMC)
- Non-flat Coatings
- Primers, Sealers and Undercoaters (PSU)
- Quick-Dry Enamels (QDE)
- Quick-Dry Primers, Sealers, and Undercoaters (QDPSU)
- Rust Preventative Coatings
- Specialty Primers
- Waterproofing Sealers (WPS)
- Waterproofing Concrete/Masonry Sealers (WPCMS)

An analysis of Technical Data Sheets (TDS) and Material Safety Data Sheets (MSDS) published by coating manufacturers is one methodology used to complete assessments of available coatings. Table 4 summarizes staff assessments of web based searches for available coatings with more complete details of those findings presented in Appendix A of this report. The list in Appendix A contains coatings that comply with the 2006 rule limits and also include super-compliant coatings for each of the categories studied. The term "super-compliant" refers to architectural coatings that have a VOC content less than the VOC content limits set forth for the current and/or future limits in the Table of Standards found in paragraph (C)(2) of Rule 1113 and specify a VOC content of less than 10 grams per liter. This list is continually updated as staff reviews additional information on available architectural coating products. The TAC has also contributed to and reviewed this list for accuracy.

Table 4
Web Based Search For Available Future Compliant Coatings

Coating Category	Number of Coating Types	No. of Products	Exterior(E), Interior(I), Dual(D), Undetermined(U)	Substrates
Clear Wood Finishes	39	77	6-E 55-I 16-D	Wood surfaces for residential & commercial floors including log and timber frame homes, siding, railings, fences, unsealed wood decks, marine trim, new or previously painted wood, masonry, metal, plaster or drywall surfaces, cabinets, paneling, molding, furniture, top coat over faux-finished.
Clear Wood Finishes, Sanding Sealer	15	20	14-I 6-D	Residential and commercial architectural finishing or use under alkyd and polyurethane varnishes. Doors, trim, cabinets, new wood furniture, paneling, bare or stained wood fixtures such as hardwoods, softwoods, plywood, particle board or masonite.
Pigmented Lacquers	7	10	2-E 6-I 2-D	Substrates include steel, aluminum siding, concrete/block, masonry, wood, masonry, prepared vinyl, stucco, brick, pumice, and primed metal surfaces.
Floor 7 Single Component 15 Multi-Component	15	20	3-E 9-I 8-D	For mechanical room floors, walking decks and vehicular traffic decks on floors of concrete such as tennis courts, playgrounds, arenas, walkways, balconies, steps and bike paths. For use on wood, steel, aluminum, plywood, metal, asphalt and concrete/masonry surfaces. Used as a chemical resistant coating and lining system for secondary containment structures, concrete floors, and other process applications.

Table 4 Cont'd

Web Based Search For Available Future Compliant Coatings

Coating Category	Number of Coating Types	No. of Products	Exterior(E), Interior(I), Dual(D), Undetermined(U)	Substrates
Industrial Maintenance	49	288		For tanks, metal buildings, structural steel, piping, handrails, masonry construction, marine exposures such as ballast tank interiors, well deck overheads, oil storage tank interiors and refined fuel storage tank interiors.
Non-flat, High Gloss	4	5	1-E 4-D	For steel surfaces, aluminum, masonry, wood, properly primed, timber, plywood, concrete, plaster, drywall, fiber cement, stucco, block, brick, particleboard, properly primed galvanized steel concrete and previously coated surfaces.
Non-flat, Medium Gloss	25	40	2-E 35-I 3-D	Ideal for walls, ceilings, wallboard, properly cured and primed plaster, sheetrock, masonry and primed metal.
Non-flat, Low Gloss	25	36	2-E 27-I 7-D	For ceilings, walls, and properly prepared galvanized and structural steel surfaces in industrial, commercial and institutional buildings and warehouses.
Primer, Sealer, Undercoater	45	110	15-E 51-I 44-D	For wallboard, ceilings, wood and wood trim, fully cured plaster, metal, steel, galvanized iron, aluminum, brick, stucco, masonry, new or previously painted drywall, sheetrock, composition board, concrete, plaster, and other porous surfaces.
Quick Dry Primer, Sealer, Undercoater	17	33	3-E 6-I 24-D	For steel, galvanized metal, wood, aluminum, masonry surfaces, piping, and handrails.
Rust Preventative	23	28	5-E 2-I 19-D 2-U	Can be used as a finish coat when applied to a primed or previously coated substrate, wood, metal, or masonry surfaces including walls, doors, trim, sash, and piping, aluminum, galvanized steel,

Table 4 Cont'd
Web Based Search For Available Future Compliant Coatings

Coating Category	Number of Coating Types	No. of Products	Exterior(E), Interior(I), Dual(D), Undetermined(U)	Substrates
Stains, Exterior	21	30		For furniture, molding, millwork, cabinets, doors, decks, masonry, brick, concrete, tilt-up, block, stucco, plaster, exterior metal, for horizontal or vertical wood siding clapboard, hardboard, shakes, shingles, beams, fences.
Water Proofing Sealers	17	23		For concrete, masonry, stucco, most wood & metal substrates, new or previously painted vertical surfaces, vertical masonry substrates such as stone, tilt-up concrete, brick, clay tile, stucco and block.
Water Proofing Concrete/Masonry Sealers	26	50		For masonry, stucco, cement block, hollow tile, split face block, cinder block, roof, brick, stone, adobe, clay tile, slate, and exposed aggregate, drywall, plaster, roof tiles, grout, galvanized metal, vinyl siding, wood decks, sandblasted block or concrete, construction grade plywood or siding, previously coated surfaces, and most porous substrates. Used on steel surfaces subject to continuous abrasion service, chlorine water immersion, salt water immersion such as fountains, aquariums, and water slides.

In addition to TDS and MSDS review, staff continues to visit sites where architectural coatings are applied, and has conducted follow-up visits to previously documented applications of low- and zero-VOC coatings. The data gathered is used to substantiate the availability, use and continuing performance of low-VOC coating products.

AQMD staff has visited more than 100 new construction sites in 2004 and 2005 in order to determine compliance with Rule 1113. Some of the sites visited by staff had coatings specified that either did not meet current VOC limits in the rules, or were not covered under the Averaging Compliance Option under Rule 1113. Staff was able to point out the inconsistencies and have them corrected prior to the application of the non-compliant products during the construction phase. Overall, most of the construction sites visited had applied architectural coatings that are much lower than the current specified limits in many different categories and had used many super-compliant products that meet the future limits in Rule 1113.

Table 5 lists a portion of the project locations visited by staff, as well as some of the coatings specified and applied at those sites.

Table 5

Examples of Construction Sites Utilizing Future Compliant & Super-Compliant Coatings

Facility	Location	Product	Coating Category	Product VOC	Future Limit
Alliance Residential Company	Upland	Dunn-Edwards Super Wall	Flat	50 g/l	50 g/l
"	"	Dunn-Edwards Ultra Grip	PSU	45 g/l	100 g/l
Bridgeport Cove	Santa Clarita	Vista Paint 3600 Flat	Flat	49 g/l	50 g/l
Chaparral Elementary School	Chino Hills	Vista Paint 4200 Terminator II	PSU	50 g/l	100 g/l
Gateway Village	Santa Clarita	Dunn Edwards Ultra Grip Primer	PSU	45 g/l	100 g/l
The Heights	Chino Hills	Frazee Int/Ext Prime Plus	PSU	60 g/l	100 g/l
"	"	Frazee W/B Lacquer Undercoater	PSU	49 g/l	100 g/l
LA Regional Transportation Management Center	Los Angeles	Sherwin Williams Promar High Holdout Primer	PSU	82 g/l	100 g/l
Macys	Rancho Cucamonga	ICI Devflex 4020PF	Rust Prev.	91 g/l	100 g/l
"	"	ICI Prep & Prime W/B Primer	PSU	100 g/l	100 g/l
Sommerville Conzelman	Rancho Cucamonga	Dunn-Edwards W101	PSU	60 g/l	100 g/l
Hector Godinez High School	Santa Ana	MonoChem Aqua Seal ME7	WP Sealer	0 g/l	100 g/l
"	"	MonoChem Aqua Seal Silane 29	WP Sealer	65 g/l	100 g/l
"	"	MonoChem Primer Sealer	PSU	0 g/l	100 g/l
Kaiser Permanente Medical	Ontario	C&A Floorcoverings C-36E Floor Primer	Floor Coatings	0 g/l	50 g/l
"	"	Monokote	Fire Proofing	0 g/l	350 g/l
Cal Trans District 7 Headquarters	Los Angeles	Edoco Finishing Aid	Concrete Curing Compound	0 g/l	350 g/l
Aegis of Chino Hills	Chino Hills	A/S FireFilm II	Fire Proofing	0 g/l	350 g/l
"	"	A/D Base Coat	Fire Proofing	0 g/l	350 g/l
Desert Art Center & Palm Canyon Theatre	Palm Springs	Sta-Crete 1500	Industrial Maintenance	0 g/l	100 g/l
"	"	Col-R-Tone III Acrylic Urethane	Non-flat	< 50 g/l	50 g/l
"	"	Kemiko Stone Tone Sealer	PSU	< 50 g/l	100 g/l
Westfield Shoppingtown Parking Structure	Palm Desert	Col-R-Tone III Acrylic Urethane	Non-flat	< 50 g/l	50 g/l
"	"	Kemiko Stone Tone Sealer	PSU	< 50 g/l	50 g/l
Park Side Villa	Stevenson Ranch	Sherwin Williams	Flat	48 g/l	50 g/l

The following pages summarize staff's findings relative to the specific coating categories that have to meet lower VOC limits by July 1, 2006.

Clear Wood Finishes

Rule 1113 defines clear wood finishes as products applied to wood substrates to provide a transparent or translucent solid film. An analysis of product data sheets supplied by various manufacturers supports staff's conclusions that the future limit of 275 g/l VOC and much lower is currently achievable. Appendix A of this report shows more than 100 products that have a lower VOC content than the future limit. Additionally, staff continues to visit sites where future compliant products in this category have been applied showing excellent performance, even when subjected to harsh conditions (high traffic) such as manufacturing areas.

Comments received from previous reports presented to the Board questioned the long-term durability of these low-VOC coatings. Staff has re-inspected many of those sites where low-VOC products were applied, and has documented the results. One such follow-up was at Barneys of New York in Beverly Hills where BonaKemi products were applied. As mentioned in the annual report to the Board in December of 2003, 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 interior residential and commercial wood flooring subject to heavy traffic. 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." The BonaTech MEGA® Satin Floor Finish was applied to the fourth and fifth story wood floors at the Barneys of New York site during September of 2003. 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 that it is very durable. He estimated that Barneys of New York would not need a maintenance coat for approximately five years. Staff returned to the site nearly a year after the coating was applied and spoke with the Director of Store Operations. The Director stated that the coatings were holding up well and that no touch-ups had been required. While staff was present, the third floor was under restoration by a different contractor utilizing the same products.

Industrial Maintenance Coatings (IMC)

The IMC category continues to be part of every study conducted by the AQMD and is considered to be the most challenging. Results of past studies indicate that coatings meeting the future limit of 100 g/l are currently available for the industrial maintenance coating category. Staff continues to obtain additional information on IMCs from TDS and MSDS analysis. Appendix A includes over 280 Industrial Maintenance Coatings (more than triple the number reported in the 2003 annual report to the Board) that are well below the July 1, 2006 100 g/l VOC limit.

Various public service agencies have completed testing of low-VOC products in recent years and have found compliant products with acceptable performance. For example, the Southern California Alliance of Publicly Owned Treatment Works (SCAP) conducted its own independent evaluation of IMCs. SCAP is a non-profit corporation organized to help ensure that regulations affecting Publicly Owned Treatment Works (POTW) are reasonable and in the publics best interest. Their testing of IMCs was conducted to identify low-VOC coating systems suitable for wastewater treatment and conveyance facilities. Participants in this study included the Los Angeles County Sanitation District, the Orange County Sanitation District, the Eastern Municipal Water District, Las Virgenes Municipal Water District and the City of Los Angeles.

SCAPs evaluation of the performance of low-VOC atmospheric and immersion coating systems, completed in February 2003, indicated that compliant coating systems meeting the performance criteria for wastewater environments and the 2006 limits in Rule 1113, performed similarly to existing coating systems.

Metropolitan Water District (MWD) initiated its own independent evaluation which is ongoing to test new products that meet their very stringent internal standards for performance and that also meet the future VOC limit of 100 g/l. As mentioned in previous annual reports, a committee was formed in September 1999 comprised of representatives from the Los Angeles Department of Water and Power (LADWP), the Department of Water Resources (DWR), the California Department of Transportation (CalTrans), and the Metropolitan Water District of Southern California (MWD). The committee, referred to as the "Essential Public Service Agencies" (EPSA), was initially tasked with identifying and testing low-VOC products and continues with the program today, through MWDs leadership.

Typical IMCs are expected to have a 7 year longevity, whereas under their more stringent criteria, MWD desires an IMC to last at least 15 years. MWDs list of approved IMCs that meet their stringent standards is utilized by the EPSA. The testing to date indicates that:

1) Available low-VOC industrial maintenance **immersion** coatings meeting the 2006 limits, conform to their stringent standards.
2) They continue to look for IMC **atmospheric** products that also meet their stringent criteria.

AQMD staff recognizes that there is a lack of atmospheric coatings available that meet MWDs rigorous standards. MWD has completed testing of some atmospheric IMCs with Tertiary-Butyl Acetate (TBAc), a solvent that EPA and CARB has determined to be VOC exempt, that they are extremely optimistic about. AQMD staff agrees that TBAc has low photochemical reactivity and understands that TBAc is a desirable solvent from the formulator's standpoint. ~~The ESPA and many~~ Many IMC manufacturers are seeking delisting of TBAc for use in coatings critical to the support of the public infrastructure. Staff is currently evaluating the limited information on TBAc's toxicity and its potential

health impacts to determine whether this solvent should be recommended to the Governing Board as exempt for use in certain IMC applications.

The MWD along with the EPSA and AQMD staff will continue to identify, test, and evaluate compliant high performance industrial maintenance coatings in the future.

Non-flat Coatings

Rule 1113 – Architectural Coatings defines non-flat coatings as registering a gloss of 5 or greater on a 60-degree meter and a gloss of 15 or greater on an 85-degree meter. The rule does not delineate various gloss ranges into distinct categories such as high, medium or low gloss.

There have been comments received from some manufacturers that a high gloss category should be developed in Rule 1113, similar to the 2000 CARB State Suggested Control Measure (SCM) for Architectural Coatings. In the SCM, high gloss coatings are those that register a gloss of 70 or above on a 60-degree meter and are allowed a higher VOC limit of 250 grams per liter. Although Appendix A lists several high gloss coatings that are currently available and are below the 50 g/l limit that will be in effect in July 2006, several coating manufacturers commented to staff that the expected performance for certain key characteristics such as dirt pickup, may not be high enough. This issue, which is due to the softer resin technology used for 50 g/l products in the high gloss non-flat and the companion quick-dry enamel category, was last brought to staff's attention within the past year. As a result, this technology assessment focused on more carefully evaluating this criteria. Subsequent discussions with other manufacturers, however, indicated that with the latest resin and additive technologies, they were able to overcome the dirt pick up issue. Discussions with raw material suppliers also reinforced the point of view that new resins that were recently made commercially available to the market will address these issues. Based on the state of technology, it appears that it is reasonable to expect that all manufacturers will be able to soon produce good performing products.

Despite this expressed concern with non-flat high gloss coatings, overall, the list of currently available super-compliant non-flats continues to grow as indicated by staff reviews and updates of information based on TDS and MSDS. There are currently over 50 coatings below 10 g/l (super-compliant) and a total of over 80 coatings below 50 g/l listed in Appendix A. This is more than double the number of coatings listed in the report to the Board in December of 2003, indicating an increasing number of available compliant products. Consumers in the Do-It-Yourself (DIY) market purchase these compliant products for their personal use in and around their homes on a daily basis.

In spite of the increase in the availability of coatings in this category below 50 g/l, the rule still incorporates alternative compliance options, such as the averaging provision and an allowable three-year sell through provision for coating manufacturers to take advantage of. However, since staff's research to date has found few low-VOC products meeting the definition of high gloss, and in light of recent test results, AQMD staff is

supportive of creating a new category specifically for non-flat high gloss effective July 1, 2006 with a VOC of 150 g/l, reducing to 50 g/l VOC by July 1, 2007. This additional time would allow manufacturers to incorporate the latest resin technologies. In addition, this would also include giving the same time extension and VOC limit of 150 g/l for the companion category of quick-dry enamels (discussed below) which are also high gloss. AQMD staff is committed to continuing further research in this area and remains open to further discussions on the issue with the TAC, and the possibility of conducting additional testing for non-flat high gloss coatings.

Primers, Sealers and Undercoaters (PSU)/Quick-Dry Primers, Sealers, and Undercoaters (QDPSU)

An analysis of currently available PSUs clearly shows that the future VOC limit of 100 g/l VOC by July 1, 2006 is attainable today. More than 100 coatings have been identified, through TDS, MSDS and on site inspections that are well below the future 100 g/l VOC. As previously shown, Table 5 lists construction sites that were randomly visited by staff throughout the AQMD jurisdiction, where PSUs were applied that met the future limits. Those coatings are applicable to a wide variety of substrates and provide physical coating characteristics that meet or exceed the performance standards typically expected of products from industry and consumers. Although not specifically called a quick dry product, many standard PSUs meet the definition of a quick dry coating and consequently are included in the staffs' analysis as a primer, sealer or undercoater.

Quick-Dry Enamels (QDE)

A subcategory of non-flats, QDEs have gloss values greater than 70 on a 60º meter and should be capable of achieving set-to-touch in at least two hours, dry-hard in at least eight hours and be tack-free in at least four hours. AQMD staff recognizes that the same problems associated with dirt pickup for non-flat high gloss coatings exist with the QDEs, and is recommending the same interim limits.

Rust Preventative Coatings

CARB surveys continue to show an increase in the number of rust preventative coatings for sale at VOC levels that meet the future limit of 100 g/l. AQMD staff evaluation indicates that super-compliant coatings with zero-VOC are currently available. These are single component, direct-to-metal (DTM) coatings that provide corrosion resistance for interior and exterior metal surfaces. Appendix A lists 28 DTM rust preventative coatings that meet the future VOC limit and are currently available from various manufacturers. Additionally, numerous products labeled as non-flats, and not specifically rust-preventative coatings, have anti-corrosive characteristics that make them suitable for application and use for the prevention of rust on metal surfaces, as indicated in manufacturer product literature. An example of a zero-VOC rust preventative coating is a product made by Sierra Performance (Rust-Oleum) called Metalmax™ DTM Acrylic Urethane Enamel, listed on Page 45 of Appendix A.

During a random field visit to a Macy's Department Store construction site in Rancho Cugamonga, AQMD staff encountered the specification and application of a rust preventative coating manufactured by ICI Devoe. The coating is called ICI Devflex 4020PF and contains 91 g/l VOC.

Specialty Primers

Specialty primers are defined in Rule 1113 as coatings intended to seal fire, smoke or water damage, or to condition excessively chalky surfaces. Many of the coatings that fall within other categories, such as PSUs, have characteristics similar to requirements for specialty primers, such as the need to condition excessively chalky surfaces. A review of the available specialty primer products are listed under PSUs and the associated characteristics in Appendix A indicates a vast amount of coatings available that meet those needs. As mentioned in the report to the Board in December 2003, sales data supplied by manufacturers and available for review in the 2001 CARB Survey, indicate that approximately 80% of the total market volume within this category is below the future limit of 100 g/l VOC, effective July 1, 2006 (including stain-blocking products).

Waterproofing Sealers (WPS)/Waterproofing Concrete Masonry Sealers (WPCMS) & Floor Coatings

Appendix A of this report lists over 70 coatings that are less than 100 g/l VOC meeting the July 1, 2006 limits for the WPS and WPCMS categories. Also, many of those same coatings listed are utilized in vertical and horizontal floor applications with VOCs that easily meet the future limit in the floor category of 50 g/l VOC.

In addition to the many floor coating products currently available and being applied throughout the AQMD, staff has met with ultra violet (UV) curable coatings manufacturers and suppliers whose products, according to MSDSs contain little to no VOCs. These companies have demonstrated the application and instantaneous curing of these UV coatings on concrete floors utilizing state-of-the-art portable UV curing equipment to staff. Although in its infancy relative to architectural coating applications, these types of coatings continue to show promise, and as the resin technology and associated portable curing equipment continue to be developed, the future of these products in the architectural coatings market will continue to grow. Applicators of these products have shown staff the versatility of these types of coatings for use on other substrates as well, including, but not limited to wood and vinyl.

Point of Distribution Product Inventory Survey

AQMD staff conducted a survey of store inventories in the spring of 2004. The purpose of the survey was to gather usable data that would provide a snapshot of the currently available architectural (and adhesive-Rule 1168) products that are being sold from various store shelves. This survey also provided data on the compliance level of the store inventories. The additional benefit to this project was that many of the store owners, corporate executives, and suppliers were made aware of the AQMDs current and future VOC limits relative to Rule 1113.

As part of this expansive outreach effort, AQMD staff prepared a distribution list for the survey along with useful compliance information on Rule 1113. The list was generated from various sources, including the Yellow Pages, internet web pages, and recommendations from retail outlet personnel. An outreach letter was then drafted and mailed to 654 stores within the AQMDs jurisdiction. Staff received a total of 131 inventory lists back from the stores. Many of the stores had their corporate offices handle the inventory list. For example, stores such as Sears and Home Depot, with multiple individual store locations in the AQMDs jurisdiction, had their headquarters provide the inventory lists to the AQMD. The submitted surveys were transcribed into a database (an Excel® spreadsheet) and each product was evaluated. The tremendous amount of data received was then examined for each coating and AQMD staff determined which coating category each would fit into. The data from the submitted surveys (the reported store sales universe) shows 21,053 line items for all products obtained from the store surveys. This data is available electronically and was used to provide the working model for the sales of architectural coatings. All of the calculations conducted by AQMD staff were based on the reported data obtained from the submitted surveys. This limited survey indicates that products meeting the 2006 VOC limits in Rule 1113 for many categories are currently available and being sold to consumers. In 2006, staff intends to randomly audit stores who failed to respond to the survey request to further evaluate their compliance.

The entire analysis and breakdown of the individual coating categories is available for further review in Appendix B of this report.

Super-compliant Coatings

Architectural coating manufacturers continue to improve the coating characteristics of their products while lowering the VOC content by introducing new types of resins and other paint constituents that are extremely low in VOC or have none at all. Table 6, updated from previous annual reports to the Board, reflects a portion of super-compliant coatings currently available. Staff has given the nomenclature “Super-compliant coatings” to those coatings that are well below the current and/or future limits for the applicable coatings categories as set forth in the Table of Standards and are indicated by the manufacturer as having less than 10 g/l of VOC. These also include those coatings that meet future limits in advance of their effective date. This list is also posted to the AQMDs website showing companies that have expressed an interest in having their products included on the page.

Table 6
Super-compliant Architectural Coating Manufacturers*

Manufacturer	Type of Coatings	Interior	Exterior	Phone Number
Alistagen Corporation http://www.caliwel.com	PSU, F	YES	NO	866-280-0001 305-936-8691
American Formulators Mfg http://www.safecoatpaint.com	F, NFE, NFSG	YES	NO	619-239-0321
Anchor Paint http://www.anchorpaint.com	WPC/MS	NO	YES	918-836-4626
Benjamin Moore & Co http://www.benjaminmoore.com	PSU, F, NFS, NFE, NFSG	YES	NO	201-573-9600
Cloverdale Paint Inc http://www.cloverdalepaint.com	PSU, NF, IM	YES	YES	604 596 6261
Coronado Paint Co http://www.coronadopaint.com	F, NF, PSU	YES	NO	386-428-6461 x115
Degussa Building Systems http://www.degussabuildingsystems.com	PSU, WPS, WPCMS	YES	YES	800-433-9517
Diamond Vogel http://www.diamondvogel.com	F, NF, P	YES	NO	800-728-6435
Dunn Edwards http://www.dunneedwards.com	F, NF	YES	NO	888-337-2468
E-3 Coatings, Inc http://www.envirolast.com	S	NO	YES	530-308-2189
Frazee Industries http://www.frazeepaint.com	PSU, F, NFS, NFE, NFSG	YES	NO	858-626-3490
Fuhr International, LLC http://www.fuhrinternational.com	PSU, F, NF	YES	YES	800-558-7437 816-809-4403
ICI Paints http://www.iciduluxpaints.com Pro painters http://www.devoecoatings.com IM coatings http://www.duspec.com MSDS & PDS http://www.glidden.com Retail for homeowners http://www.ici.com Corporate	PSU, F, NFS, NFE, NFSG**	YES	YES	440-826-5519
Kryton http://www.kryton.com	WPS	YES	YES	
Miller Paint http://www.millerpaint.com	PSU, F, NFE, NFS	YES	NO	503-407-2532
Monopole Inc. http://www.monopoleinc.com	IM, WPS, WPC/MS	YES	YES	818-500-8585
Polibrid Coatings http://www.polibrid.com	F, NF, PSU	YES	YES	956-831-7818
Richards Paints http://www.richardspaint.com/	F, NFS	YES	NO	800-432-0983
PPG (Pittsburgh Paints) Pure Performance Coatings http://www.ppg.com/ppgaf/pittsburgh/ppcon.htm & General PPF Architectural Finishes http://corporate.ppg.com/PPG/SBU/Architectural Finishes/default.htm	PSU, F, NF	YES	YES	412-434-3548
Rodda Paints http://www.roddapaint.com/	PSU, F, NFE, NFS	YES	NO	503-737-6031 x6051
Sampson Coatings, Inc. http://www.sampsoncoatings.com	PSU, F, NF	YES	YES	804-359-5011
Samuel Cabot, Inc http://www.cabotstain.com	WPS	NO	YES	800-877-8246
Seal-Krete Inc. http://www.seal-krete.com	PSU, F	YES	YES	800-323-7357 x541
Sierra Performance by Rust-Oleum http://www.rustoleum.com	PSU, F, NF	YES	YES	800-553-8444
Silvertown Products http://www.rhinoguard.com	S, CWF	NO	YES	909-986-7061

Table 6 Cont'd
Super-compliant Architectural Coating Manufacturers*

Manufacturer	Type of Coatings	Interior	Exterior	Phone Number
Spectra-Tone Paint http://www.spectra-tone.com/	F, NFE, NFSG	YES	NO	800-272-4687
Tried & True Wood Finishes http://www.triedandtruewoodfinish.com	CWF	YES	NO	607-387-9280
Vista Paint http://www.vistapaint.com	NF	YES	YES	714-680-3800
VOC Free No Website	FLOOR SEALER, PSU, F, NF	YES	YES	201-457-1221
Industrial Maintenance Coatings				
Manufacturer	**Type of Coatings**	**Interior**	**Exterior**	**Phone Number**
Ameron, Intl. http://www.ameroncoatings.com/welcome.cfm	VARIOUS SYSTEMS	YES	YES	800-926-3766
Duromar http://www.duromar.com/	VARIOUS SYSTEMS	YES	YES	781-749-6992
JFB Hart Polymers http://www.jfbhartcoatings.com/	VARIOUS SYSTEMS	YES	YES	630-574-1729
Novocoat (Formerly) Superior Environmental Products, Inc http://www.novocoat.com	VARIOUS SYSTEMS	YES	YES	972-490-0566
Pacific Polymer http://www.pacpoly.com/	VARIOUS SYSTEMS	YES	YES	800-888-8340
Specialty Products Inc. http://www.specialty-products.com	VARIOUS SYSTEMS	YES	YES	253- 983-7530
United Coatings http://www.unitedcoatings.com/	VARIOUS SYSTEMS	YES	YES	800-541-4383

CWF	Clear Wood Finish
F	Flats
NF	Non-flat
NFS	Non-flat - satin
NFE	Non-flat - eggshell
NFSG	Non-flat - semi-gloss
PSU	Primers, sealers, and undercoaters
S	Stains
WPS	Waterproofing Sealer
WPCMS	Waterproofing Concrete/Masonry Sealers

** Super-compliant coatings are defined as those coatings that have a VOC content less than the VOC content limits set forth for the current and/or future limits in the Table of Standards found in paragraph (c)(2)of Rule 1113 and specify a VOC content less than 10 g/L.*

*** Not available for exterior use.*

This is not an all-inclusive list of super-compliant coatings available from manufacturers/suppliers who have informed SCAQMD that they can provide the super-compliant products listed.

The SCAQMD in no way endorses any of these companies nor does it certify their ability to meet the requirements of Rule 1113 Architectural Coatings. If you want your company included in this page, please send your request to ddeboer@aqmd.gov or call David De Boer at (909) 396-2329.

Summaries of Select Articles on Advancements in Architectural Coating Technology

As AQMD staff continues to research new coating technologies that are available across all coating categories, it becomes clear that compliance has relied heavily on the research and development efforts of the raw material suppliers to the architectural coatings industry, and active follow up by individual coating company reformulations. Numerous articles, journal publications, and technical bulletins discuss progress in the area of lower VOC products for the coatings industry, primarily to meet the demand driven by regulatory concerns, as well as the desire of the general public and governmental agencies to specify and use environmentally-sound products.

The following summaries of articles are provided as testimony to the ongoing technology achievements based on those research and development efforts across a wide array of coatings manufacturers and raw materials suppliers throughout the world. Although some of the articles presented do not specify VOC contents, their premise is that the application of coatings with lower-VOCs are effective in lowering total volatiles, resulting in environmental benefits.

BASF introduces Acronal Optive® 130 all-acrylic latex polymer, www.basf.com/corporate/news2002/newsinfo_acronal_101802.html This article was released on October 28, 2002.

BASF Corporation's Architectural Coatings Raw Materials Business Unit has introduced Acronal Optive® 130, a technological breakthrough in exterior and interior architectural coatings in zero and low-VOC formulation that delivers high performance for flat through semi-gloss paints without sacrificing critical paint performance and at a lower formulated cost. Acronal Optive 130 provides formulators and manufacturers the ability to meet existing and expected future VOC regulations today without having to reformulate today and then again in a few years. For semi-gloss paints, Acronal Optive 130 delivers a high level of block resistance, scrub resistance, gloss, and wet adhesion in zero to 150 g/l VOC formulations. In flat paints, Acronal Optive 130 exhibits excellent low temperature touch-up, high scrub resistance and superb thickener efficiency in zero to 150 g/l VOC formulations. Acronal Optive 130 is composed of an all-acrylic backbone providing excellent outdoor durability and supported by long term exposure testing. Acronal Optive 130 does not require a coalescent to form a film, giving the formulator the option of reducing formulated costs and/or adding additional glycol for increased open time. The enhanced thickener efficiency of Acronal Optive 130 and the ability to replace several polymers with one gives manufacturers an additional economic and performance advantage.

This product is currently being used in large volumes by most of the manufacturers selling architectural coatings in California. In addition, BASF offers other Acronol products such as 110, 230 and 330 polymers that can be used for coatings at 50 g/l or less.

"The Effect of Water Resistance on the Durability of Waterborne Coatings." David Kelly, Project Leader, Architectural and Functional Coatings Research, Rohm & Haas, Spring House, PA., October 22, 2003.

Water resistance, UV resistance and the ability to resist damage on thermal cycling are some of the main components that determine exterior durability of many types of coatings. Coatings that are used on low-slope (or flat) roofs need to have high water resistance for good durability, due to the possibility of ponds forming on these roofs as well as needing good UV resistance and resistance to thermal cycling damage. Under conditions of ponded water, coating blistering is evidence of poor water resistance.

Water borne coatings are especially susceptible to durability issues pertaining to poor water resistance. Most formulation components for waterborne coatings are either water soluble or have colloid stability (e.g., latex polymer). In all cases, the functional groups on polymers that are used are susceptible to hydrogen bonding or are ionic. Unless the hydrophilic character is balanced with the hydrophobic, the coating will either be water sensitive or the formulation will not have colloidal stability. In addition, the water sensitivity of the latex polymer binder may also impact overall coating water sensitivity. In addition, the water sensitivity of the latex polymer binder may also impact overall coating water sensitivity. We have used coating water absorption, water vapor permeability and blister resistance to characterize the factors in waterborne coating formulations that pertain to water sensitivity. The factors studied include formulation components for stability and rheology control, as well as latex polymer hydrophobicity.

Our research shows that waterborne coatings can be made resistant to water and durable to ponded water situations such as those that might be encountered on low-slope roofs. We have found that hydrophobic components in the formulations, as well as the use of hydrophobic binders, will give the best combination for improving the water resistance of waterborne coatings. This will result in waterborne coatings that can resist blistering over hydrophobic substrates for up to four to six months of continuous immersion in water. However, in the design of polymers for ultimate durability, the UV resistance of hydrophobic materials must also be considered to give the best exterior durability.

Information from Paint Square and the Pugh & Co. International web site, January 21, 2005.

Pugh & Co. International has developed an ultra low-VOC primer, Actan® GS, with a VOC content of less than 0.1 g/l. The primer has been developed for treating galvanized and non-ferrous metals and bonds with the surface to form a film that is transparent, hard, flexible, impact resistant and non-porous. It gives great adhesion prior to the application of a wide range of one and two pack protective paint systems, including chlorinated rubbers, vinyls, acrylics, epoxies and polyurethane. This product has been certified by the British Board of Agrément under the Highways Authorities Product approval Scheme for use as part of a specification for the protection of steelwork in accordance with the Manual of Contract Documents for Highway Works. The primer is currently being used with a 100 percent water based paint system to protect pipe-work in one of the tunnels

beneath the Thames Barrier in London. In addition, Pugh & Co. International have also developed Kelate® which is a high quality water-borne product that neutralizes the corrosion process. It reacts quickly with the rust and transforms iron oxides into a stable and insoluble blue-black metallo-organic complex which is ready for painting after reaction. Reaction time is approximately three hours. This product is supplied to major paint manufacturers all over the world for making chelating surface treatment and is 100 percent VOC free. It is a chelating polymer that has been designed for field application to rusted steel which has been hand or power cleaned, or blasted.

Chemolak, Tovarenska 1, 91904 Smolenice, Slovak Republic, Tel: 421-805-55-60-611, Information found on internet website, www.rec.org/ecolinks/bestpractices.

In Slovakia there are 25,000 tons of VOC released yearly into the air and the reduction of VOC emissions is a high priority. Chemolak, a European paint manufacturer in the Slovak Republic produces approximately 20,000 tons of coatings per year. In 2000 Chemolak began a project to replace harmful organic solvents with water-based polyurethane dispersions in manufacturing paints and lacquers. With the substitution of this environmental friendly technology, emissions were reduced to 10 percent of former levels. The new process avoids the emission of 500 tons of VOC per year. The project resulted in environmental benefits as well as economic benefits such as the polyurethane product is 5 percent less expensive than other currently available similar products, a polyurethane dispersion produces quality varnish products, market potential is increased because of residential use, and the company is in compliance with new environmental legislation.

Market Updates for Resin Manufacturers, JCT Coatings Tech, January and February 2005

Lyondell Chemical Company commercialized its Acryflow™ line of acrylic polyols which are prepared in a proprietary process using hydroxyl-functional allylic monomers. Acryflow polyols maintain their functionality at a low molecular weight so coating formulators do not need to trade performance for lower VOC content. These Acryflow polyols are designed to be blended together for use in a variety of applications including high-solids, UV, and moisture-curable coatings. The blending approach optimizes formulation latitude while reducing resin inventory costs, increasing coating performance, and lowering VOC content.

The Rohm and Haas Company has introduced several new products for low-VOC architectural paint applications. Rhoplex™ AC-364 and Rhoplex Multilobe™ 300 are 50 g/l flat binders and they are developing and close to launching 50 g/l VOC semi-gloss and high gloss binders that will give the performance of their conventional counterparts.

The Lubrizol Corporation acquired Noveon which introduced Sancure® 20041 a low-VOC polyurethane dispersion for clear wood finishes. Noveon also launched several coatings resins for architectural and masonry/specialty construction applications. Carboset® XPD-2860 is an acrylic emulsion for zero-VOC interior and exterior latex

paints that possesses outstanding scrub resistance. Carboset® 7733 is an acrylic emulsion for low-VOC interior and exterior semi-gloss and gloss paints that also offers excellent scrub resistance. Carboset® XPD-2790 is an acrylic emulsion for low-VOC primers with excellent tannin and stain blocking. Noveon will be introducing a new low-VOC, high-solids, waterborne oil-modified polyurethane for clear or pigmented interior or exterior wood coatings.

BASF is investing in future opportunities for nanotechnology-based latex resins, and has demonstrated with early prototypes that nanoparticles can impart extraordinary strength and hardness with very low-VOC demand.

Reichhold is developing Arlon® 848, which is a water-based acrylic emulsion resin that is low in VOC and low in HAPS, designed for airless spray applications possessing excellent corrosion resistance and use in direct-to-metal applications.

Micro-Dispersion™ - A New Water-Borne Technology, Joseph Nothnagel, Eastman Chemical Co. Presented at the International Waterborne, High-Solids, and Powder Coatings Symposium, February 26-28, 2003.

Because of government regulation of VOC over concern for the environment and public health, competing technologies have developed in the coating industry to lower the VOC content. Two distinct types of waterborne coatings continue to command the bulk of research which are emulsion polymerization in which hydrophilic assistants are used in order to ensure the stability of the dispersion and replacement of some of the solvent with water as part of the medium to carry the film-forming components of the paint. These near zero VOC Micro-dispersion coatings have extremely low acid values, no external surfactants, small particle sizes and high molecular weight (equal to or greater than conventional solvent based polymers. This abstract devotes most of the discussion to the micro-dispersions and also briefly discusses other alternative compliant technologies.

Eartheasy.com

Indoor air is three times more polluted than outdoor air, and according to the EPA, is considered to be one of the top 5 hazards to human health. Paints and finishes release low level toxic emissions into the air for years after application. The source of these toxins is a variety of VOCs, which, until recently, were essential to the performance of the paint. New environmental regulations, and consumer demand, have led to the development of low-VOC and zero-VOC paints and finishes. Most paint manufacturers now produce one or more non-VOC variety of paint. These new paints are durable, cost-effective and less harmful to human and environmental health.

Radical Change in Research and Development, Dean C. Webster, North Dakota State University, JCT Coatings Tech, April 2005.

Paint and coating formulations are a complex mixture of one or more resins and crosslinkers, solvents, curing catalysts, flow and leveling additives, gloss modifiers, stabilizers, pigments and their dispersants and dispersion stabilizers and so. Coatings are also required to meet a combination of performance requirements. Coating formulators are challenged to use whatever information they can gather to help them decide what ingredients to use and in what ratios to mix the ingredients in order to achieve the optimum in performance properties. The process of formulating new coating products has largely remained unchanged for over 100 years and statistical experimental design has not yet become standard practice for coatings formulators. Combinatorial and high throughput methods have been practiced in the field of drug discovery for over a decade. It was recognized that it was almost impossible to predict what specific chemical compound would have a desired effect in treating a disease or condition. Synthesizing a series of compounds one at a time and testing them one at a time is an extremely inefficient use of resources. Methods were developed to facilitate synthesis of multiple compounds simultaneously and then to screen them for their activity. These techniques have evolved to the point that libraries of thousands of chemical compounds can be synthesized and screened in a single day. If these methodologies were used in the formulation of coating, the improved throughput of experiments is expected to have several important consequences. First, acceleration of the experimental process means that a series of experiments that once took six to 12 months can now take one to two weeks to arrive at the same result. This acceleration means that the time from product conception to product introduction can be shortened considerably.

Correlation Between Solids Content and Hiding as it Relates to Calculation of VOC Content in Architectural Coatings, Albert Censullo, Dane Jones, Max Wills, Dept. of Chemistry and Biochemistry, California Polytechnic State University, December 2004.

The researchers determined that although for a particular coating the hiding improves as the solids content increases, across different coatings, higher solids content does not necessarily equate to better hiding. In many cases, a 35 percent solids by volume water-based coating hides as well as a 60 percent solids by volume solvent-based coating. Accordingly, since the basis for using "VOC, less water and less exempts" was not supported by this study, this standard for the VOC content for house paints does not appear to be the ideal standard. The researchers developed a different standard, termed "hiding VOC", which is defined as the amount of VOCs emitted by hiding (as opposed to simply covering) one square meter with a paint. Using this measure, among the flat and non-flat paints tested, the solvent based coatings on average emitted over ten times as much VOC to hide the same area as the waterborne paints.

Rohm and Haas Introduces Rhoplex™ VSR-50 Emulsion An Innovative 100% Acrylic Binder for Interior/Exterior 50 g/l VOC Paints, Philadelphia, PA, November 1, 2005

The following information is taken directly from a Rohm and Haas News release dated November 1, 2005:

Rohm and Haas has launched an innovative binder, Rhoplex VSR-50 emulsion, into the coatings market. The new 100% acrylic binder is designed for premium-performance, interior and exterior, flat to gloss architectural coatings and is particularly useful in formulating paints to 50 g/l VOC.

Paints based on Rhoplex VSR-50 emulsion have shown performance benefits similar to those of other Rhoplex 100% acrylic binders but offers much lower VOC levels. Paints based on this innovative binder exhibit excellent durability, color retention, dirt pick-up resistance, block resistance, alkali and efflorescence resistance, and an excellent overall balance of properties which paint manufacturers have come to expect from the Rhoplex name.

Rhoplex VSR-50 emulsion is the latest addition to the Rhoplex family of binders which use a combination of innovative technologies from Rohm and Haas. Its composition has been designed to optimize the balance of properties with lower levels of co-solvent. For further information about this product or about any Rohm and Haas products, please contact you local Rohm and Haas Representative.

Rohm and Haas is a Philadelphia-based specialty materials company which makes products for the personal care, grocery, home and construction markets, and the electronics industry. The company had annual sales of approximately $7.3 billion in 2004 with operations in 27 countries. Additional information about Rohm and Haas can be found at www.rohmhaas.com.

Papers Presented at Recent Conference in 2005

In addition to the articles researched relative to the development for lower VOCs in architectural coatings, recent papers and presentations made at the 27th Biennial Western Coatings Societies Symposium & Show in November 2005 indicate the availability and support from resin and additive suppliers of low- VOC coating components that meet and exceed the future VOC limits in Rule 1113 and expected performance characteristics as compared to traditional higher VOC containing materials.

CARB/SCAQMD Reactivity Study

As a part of the 1999 amendments to Rule 1113 – Architectural Coatings, the AQMD Board approved a resolution, directing the staff to assess the reactivity and availability of solvents typically used in the formulation of architectural coatings. As a part of that effort, staff also included an assessment to further understand the interactions between various architectural coating emissions and mobile emission sources on particulate matter (PM) formation.

As an active member of the Reactivity Research Working Group (RRWG), a public-private partnership with a charter to conduct research on reactivity-based controls to determine whether it is feasible as an alternative compliance option, staff has coordinated their current efforts with CARB and RRWG. As part of the collaborative effort, a study was completed in 2005 using an environmental chamber at the University of California at Riverside (UCR). The study used the chamber to evaluate mechanisms for photochemical O_3 formation under low NO_x conditions (Carter 2004) and for other projects. A final report has recently been released and the CARB and AQMD will continue to address the possibility of an alternate ozone control strategy.

AQMD staff will continue to monitor all reactivity-related research at the RRWG, and plans to work closely with CARB staff. However, based on the latest research and analysis, as well as the recommendations of the researcher to conduct additional analysis, staff supports the continuation of a mass-based ozone control strategy, with future consideration for a reactivity-based approach. Appendix D of this report contains more detailed information regarding the research conducted relative to this study.

Alternate Means of Compliance

Averaging Compliance Option

In order to promote compliance flexibility and allow manufacturers additional time to reformulate certain compliant products of their choice, an averaging provision was added to Rule 1113. The November 8, 1996 amendments to Rule 1113, added an Averaging Compliance Option (ACO) for the Flats category. Subsequent amendments streamlined its implementation and added additional categories to provide additional compliance flexibility with the future limits. There are currently eight manufacturers that are utilizing the ACO for averaging a variety of coating categories including flats, non-flats, floor, industrial maintenance, primers, sealers, undercoaters, quick-dry primers, quick-dry sealers, quick-dry undercoaters, quick-dry enamels and rust preventative.

Three manufacturers submitted plans for the period of June 30, 2001 to July 01, 2002, all of which elected to average flat coatings. These three companies were Surface Protection Industries, Dunn-Edwards and Sherwin Williams. Staff completed audits for the first three participating manufacturers and concluded that they were fully compliant with rule requirements during that compliance period.

The second round of ACO audits is currently underway for eight participating manufacturers specific to the compliance period in 2003. The eight manufacturers' plans under review by staff include Dunn-Edwards, EVR-Gard, Frazee, ICI Dulux, Sherwin Williams, Surface Protection Industries, Tibbets Newport and Vista Paints.

The compliance period for 2004 included nine participating facilities. Staff intends to initiate auditing the 2004 ACO programs as soon as the 2003 ACO programs audits are completed. It should be noted that the eight manufacturers participating in 2003 opted to continue their plans in 2004 with slight modifications and one additional company, Rust-Oleum, was added.

The same manufacturers that have participated in the ACO since 2003 continue to do so for the current 2005 compliance period except for Rust-Oleum. Staff has been informed by Rust-Oleum that they have reformulated their product line to meet the limits as specified in Rule 1113 and no longer need to use the ACO program.

The ACO Program is available to manufacturers that desire to exceed specific coating category VOC limits by offsetting the emissions with reductions from coatings below the allowable VOC limits stated in the rule. The extensive ongoing audit process helps to verify that the ACO program results in equivalent emission reductions and is enforceable.

Sell Through Option

Another compliance option available to architectural coating manufacturers allows 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. Many manufacturers continue to take advantage of this available option in order to allow them additional time to reformulate their products just prior to the effective date change in the limits. This allows the manufacturers to eliminate any potential losses in revenue due to excess stock of non-compliant coatings.

Small Container Exemption

The small container exemption provides VOC regulatory relief to the manufacturers provided they submit an annual report within three months of the end of each calendar year for their products that are sold in 1 quart size containers or less. If a manufacturer fails to submit their annual report, the manufacturer can no longer claim the exemption. Staff does notify the manufacturers by letter or e-mail if their annual report has not been received on time. This is done to ensure that all the manufacturers are reminded of the small container exemption and to facilitate their compliance with the rule. The number of reporting manufacturers selling coatings within the AQMDs jurisdiction under this exemption has increased over the years. Table 7 below shows the trend.

Table 7
AQMD Small Container trends, 2000-2004, Companies Reporting

	2000	2001	2002	2003	2004
No of Companies Reporting	12	13	15	24	29

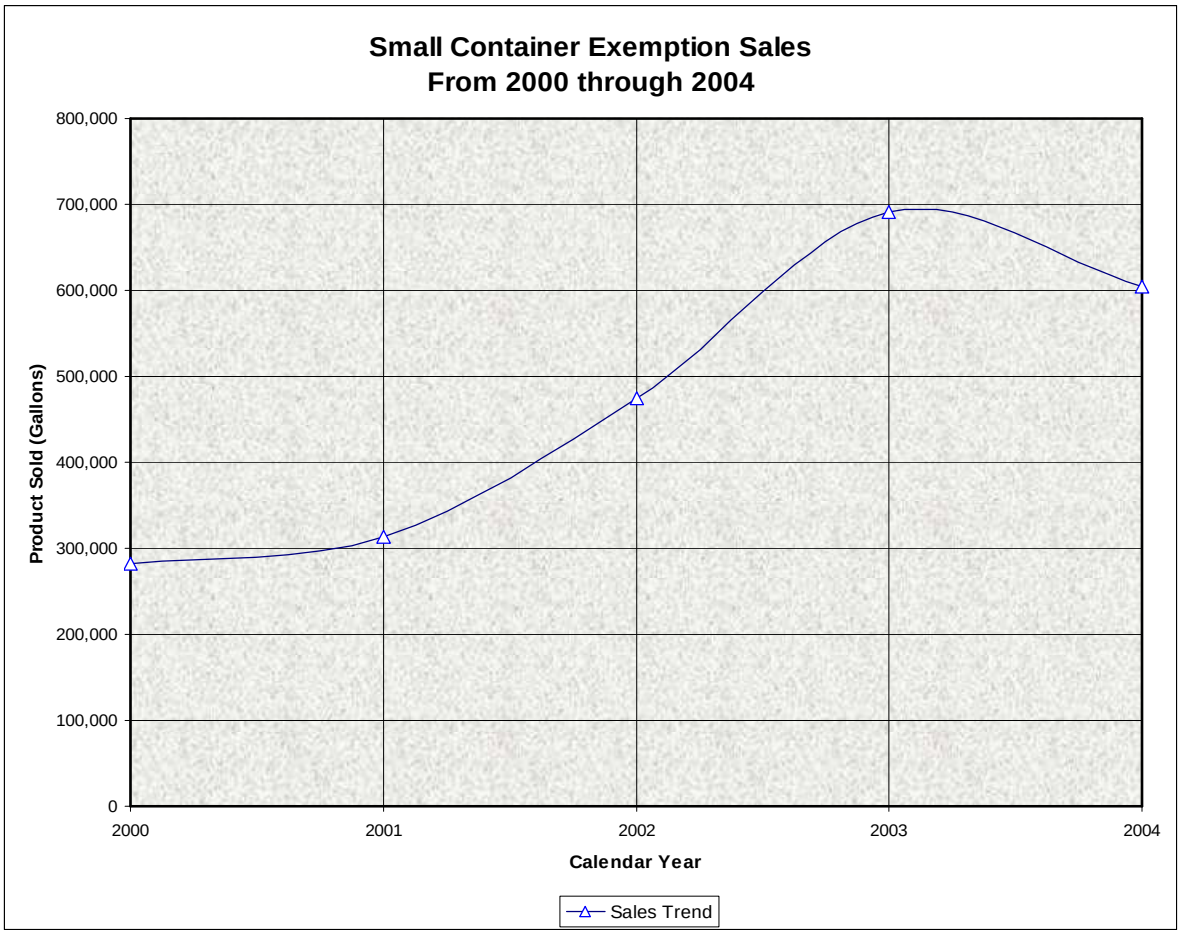
Staff has been actively tracking the statistics of the small container exemption under Rule 1113. Table 8 shown below displays the data from the year 2000 through 2004. The table also summarizes the total volume of coatings sold under the small container exemption in Rule 1113.

Table 8
AQMD Small Container Trends, 2000-2004, Product Category Sales

Coating Category	2000 (Gallons)	2001 (Gallons)	2002 (Gallons)	2003 (Gallons)	2004 (Gallons)
Faux	127.5	189.5	0.0	9,943.0	6,202.3
Flat	246.3	4,812.8	24,613.2	10,645.4	6,358.4
Floor	0.0	70.0	0.0	1,709.5	840.0
IMC	641.4	0.0	169.3	21,998.0	360.0
Lacquers	237.0	1,332.9	1,963.7	745.0	2,404.0
Mastic Coatings	0.0	0.0	0.0	35.0	0.0
Metallic Pigmented	0.0	101.0	0.0	1,487.0	153.8
Multi-color	109.0	0.0	0.0	0.0	0.0
Non-flat	13,818.6	19,748.4	9,502.9	98,752.9	36,640.5
PSU	18,864.0	13,225.2	26,196.8	25,043.3	21,903.7
QD-E	0.0	0.0	0.0	4,605.0	4,682.6
QD-PSU	1,335.0	1,651.0	327.0	4,465.0	14,826.3
Roof Coating	0.0	0.0	0.0	32,969.0	8.8
Rust Pre. (> Rule Limit)	0.0	0.0	0.0	70.0	107.0
Sanding Sealers	583.0	734.5	4,060.5	2,824.6	3,653.8
Stains	120,299.0	141,649.5	220,058.3	250,243.1	270,601.3
Traffic Coating	0.0	0.0	0.0	7,250.0	0.0
Varnishes	125,763.7	130,196.9	186,557.4	217,288.9	235,140.1
Waterproofing Sealers	196.5	48.0	1,797.5	1,477.5	92.0
WCMS	0.0	0.0	0.0	229.0	17.0
TOTALS	282,221	313,760	475,247	691,781	603,995

One can see from Table 8 that the total sales for each year increased except for year 2004. Graph 3 presents the totals shown in Table 8 in graphical format.

Graph 3
AQMD Small Container Trends, 2000-2004, Total Sales



Summary of Past AQMD Sponsored and Other Coating Studies

To address concerns by industry representatives and coating manufacturers that lowering the allowable VOCs in products to meet the future 2006 limits may compromise the coating characteristics such as applicability and durability, staff has contracted with industry experts and conducted several studies over the years. Staff also continues to review those completed by other agencies and the industry.

Prior reports and summaries of reports submitted to the Board regarding architectural coatings include coating technology assessments and product availability studies that indicated the availability of compliant coatings in the specific categories studied. A review of those studies supports staffs contention that super-compliant coatings meet or exceed expected characteristic performance standards compared to products that have much higher VOC content.

National Technical Systems

In 1998, during rule development efforts, the AQMD contracted with National Technical Systems (NTS) to obtain performance data for various coatings. The study analyzed the application and durability characteristics of 94 individual coatings and 44 coating systems. The findings of the laboratory testing portion of the study indicated that the zero- and low-VOC products showed similar and in some cases, better performance properties than the high-VOC coatings. Following the laboratory testing of the coatings, an accelerated weathering study of the coating systems including a 24-month exposure test was conducted to evaluate ambient conditions on the paint systems. At the end of the two-year outdoor test, the results continued to show that the zero and low-VOC coatings tested were similar in weathering and durability characteristics and in many cases outperformed the higher-VOC solvent borne counterparts. The same panels are still being exposed to the outdoor elements at two locations in the South Coast Air Basin. The periodic review by AQMD staff continues to show similar trends of degradation over time, further substantiating the overall good performance of the low- and zero-VOC coatings when compared to the higher VOC products in the same category.

AVES Study

In May of 1999 the AQMD awarded a contract to AVES, an affiliate of ATC Associates Inc. to develop architectural coatings with little or no volatiles. AVES was able to develop coatings that included various stains, waterproofing sealers and clear wood finishes and presented the findings in a final report titled, "Development and Demonstration of Zero- and Low-VOC Resin Technology for Advanced Control Measure Development", issued on March 29, 2001. AQMD laboratory analysis confirmed that the new coatings formulated for the project contained less than 10 g/l of VOCs.

AQMDs staff opinion was that the coatings formulated for the study could readily be applied in typical architectural settings. In actuality, the original company, and many of its employees, along with the rights to the formulation data had been bought by a major coating manufacturer and those initial products have been further improved upon and are now commercialized throughout North America.

KTA-Tator

In March of 2001, the AQMD awarded a contract to KTA-Tator, Inc. for the study of various coatings. The evaluation reviewed performance characteristics of 31 products in four architectural coating categories that included floor coatings, non-flat interior and exterior high gloss paints, interior and exterior primers, sealers and undercoaters and interior stains. AQMD staff concluded that the overall results substantiate current and future limits.

Public Service Agencies

SCAP Assessment

As previously mentioned, SCAP, (Southern California Alliance of Publicly Owned Treatment Works) a non-profit corporation organized to help ensure that regulations

affecting Publicly Owned Treatment Works (POTW) are reasonable and in the publics best interest, initiated an independent study separate from the EPSA study in September 2000 to identify low-VOC coating systems suitable for wastewater treatment and conveyance facilities. Participants in this study included the Los Angeles County Sanitation District, the Orange County Sanitation District, the Eastern Municipal Water District, Las Virgenes Municipal Water District and the City of Los Angeles.

An evaluation of the performance of low-VOC atmospheric and immersion coating systems both in laboratory testing and a two-year field exposure was completed. The industrial maintenance coating systems represented three VOC content ranges: the first group of coatings (250 g/l to (<340 g/l) complied with the January 01, 2003 VOC limits, the second group (100 g/l to <250 g/l) represents coatings that comply with the January 1, 2004 VOC limits; and the third group of coatings (<100 g/l) meets the July 1, 2006 VOC limits in Rule 1113.

The results of the study, completed in February 2003, indicated that compliant coating systems meeting the performance criteria for wastewater environments and 2006 limits are currently available and perform similarly to existing coating systems.

EPSA Assessment

The technology assessment for the Essential Public Service Agencies (EPSA) that was initiated in late 1999 at the Boards directive is complete. The assessment was established by a committee comprised of representatives from the AQMD, Metropolitan Water District of Southern California, the Department of Water Resources, Cal Trans and the Los Angeles Department of Water and Power. As previously mentioned in this report, the testing completed to date, indicates that available low-VOC industrial maintenance immersion coatings meeting the 2006 limits, conform to their stringent standards; however, they continue to look for IMC atmospheric products that also meet the criteria.

AQMD staff has recognized that the currently available 100 g/l VOC or less atmospheric coatings may not meet MWDs and the EPSA rigorous standards. Further testing by MWD of the federally exempted solvent, TBAc, shows much promise. ~~The EPSA and m~~Many IMC manufacturers would like to see the AQMD delist TBAc to make the development of compliant coatings easier. AQMD staff is supportive of the partial delisting of TBAc for use in heavy duty atmospheric IMCs, although staff is awaiting the completion of an analysis of any potential toxic risk fro this limited use.

The MWD along with the EPSA and AQMD staff will continue to identify, test, and evaluate other compliant high performance industrial maintenance coatings in the future.

Rule 1136 Technology Assessment

The technological assessment, issued in June 2003, for Rule 1136 – Wood Products Coatings indicates 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. There are many 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. Those companies support the feasible use of low-VOC products and staff discussions with the low-VOC coating manufacturers suggest a cross-over of use of the same products for shop- and field-finishing applications. This supports staff conclusions that the products far below 275 g/l VOC currently being utilized in the wood products manufacturing industry covered under Rule 1136 can make a transition to field applications under Rule 1113.

Current Coating Study

The requirements under Rule 1113 state that a technology assessment for certain coating categories shall be completed prior to July 1, 2005. Although not specific as to the type of assessment, the AQMD has continually sought additional funding to support laboratory testing of architectural coatings through the release of Requests for Proposals (RFP). In May of 2004, the AQMD released an RFP to solicit and qualify a consultant with technical expertise in the field of testing and analysis of recently developed and commercially available architectural and industrial maintenance coatings.

The overall results of this most recent architectural coatings laboratory evaluation by UMR, continues to support staff's conclusions. In all instances except non-flat high gloss and QDEs, commercially available products that meet the 2006 limits listed in the Table of Standards for Rule 1113 have performance characteristics that are similar to and in many cases better than their higher-VOC counterparts. The results of the findings are summarized on the following pages, with the empirical data available for review in Appendix C of this report.

University of Missouri - Rolla Coatings Institute (UMR)

In June of 2004, a contract was awarded to UMR to conduct an evaluation of various architectural coatings as selected and approved by the TAC and AQMD staff. The testing consisted of three phases, each analyzing a series of coatings in one or more categories.

Phase 1

The first phase was completed in April 2005 and tested twelve non-flat coatings ranging from 0 to 242 g/l of VOC. The results of the testing are included in Appendix C of this report. Table 9, shown below, lists the coatings tested in Phase I.

Table 9
Phase I UMR Study, NF

Product Name	Published VOC	VOC Determination	VOC Group
Group 1:	**High Gloss Non-flats**		
Product A1	242 g/L	>50 g/L	High-VOC
Product B1	149 g/L	>50 g/L	High-VOC
Product C1*	50 g/L	>50 g/L	High-VOC
Product D1	0 g/L	≤50 g/L	Low-VOC
Group 2:	**Medium Gloss Non-flats**		
Product E1	150 g/L	>50 g/L	High-VOC
Product F1	144 g/L	>50 g/L	High-VOC
Product G1	0 g/L	≤50 g/L	Low-VOC
Product H1	0 g/L	≤50 g/L	Low-VOC
Group 3:	**Low Gloss Non-flats**		
Product I1	150 g/L	>50 g/L	High-VOC
Product J1	112 g/L	>50 g/L	High-VOC
Product K1	<50 g/L	≤50 g/L	Low-VOC
Product L1	49 g/L	≤50 g/L	Low-VOC

*** Subsequent SCAQMD Laboratory analysis indicated actual VOC of 150 g/l**

The overall results of the Phase I testing for non-flat coatings continue to support prior testing and other research efforts conducted by staff that low-VOC coatings perform as well as higher VOC counterparts, and in many instances outperform them. For example, for the medium and low-gloss categories dry time properties for the low-VOC products were generally better than the high-VOC counterparts, whereas block resistance, scrub resistance, and UV resistance were overall similar. The freeze thaw properties were lesser for the low-VOC compliant products. However, freeze thaw properties are not as significant a concern in Southern California as in other parts of the country.

In the non-flat high gloss category, there was an issue with one of the two low-VOC high gloss coatings selected for testing. One of the products chosen as a low-VOC high gloss product based on manufacturer supplied data, listed above as C1, outperformed all other coatings in the testing phase. Unfortunately, it was determined through AQMD laboratory VOC testing that this product did not meet the future VOC limit. As a result, for the non-flat high-gloss category, only one low-VOC compliant coating was tested and it had lesser performance in some characteristics but equal or better performance in others, when compared to the high-VOC counterparts. For example, block resistance and stain resistance using carbon black properties were lesser, whereas UV resistance is overall similar.

Phase 2

The second phase was completed in November 2005 and consisted of testing primers, sealers, and undercoaters (PSU), waterproofing and concrete masonry sealers (WPCMS), exterior stains (ES) and clear wood finishes (CWF). The highest VOC containing coating had 390 g/L of VOC and the lowest VOC containing coating had 12 g/L of VOC.

The results of this second testing phase are also included in Appendix C of this report and includes the raw data. Table 10, shown below, lists the coatings tested in Phase II.

Table 10
Phase II UMR Study, PSU,WPCMS,ES,CWF

Product Name	Published VOC	VOC Determination	VOC Group
Group 4:	**Primers/Sealers/Undercoaters**		
Product A2	142 g/L	>100 g/L	High-VOC
Product B2	125 g/L	>100 g/L	High-VOC
Product C3	63 g/L	≤100 g/L	Low-VOC
Product D3	58 g/L	≤100 g/L	Low-VOC
Group 5:	**Waterproofing & Concrete/Masonry Sealers**		
Product E3	390 g/L	>100 g/L	High-VOC
Product F3	350 g/L	>100 g/L	High-VOC
Product G3	270 g/L	>100 g/L	High-VOC
Product H3	92 g/L	≤100 g/L	Low-VOC
Product I3	86 g/L	≤100 g/L	Low-VOC
Product J3	< 65 g/L	≤100 g/L	Low-VOC
Product K3	12 g/L	≤100 g/L	Low-VOC
Group 6:	**Exterior Stains**		
Product L3	250 g/L	>100 g/L	High-VOC
Product M3	0 g/L	≤100 g/L	Low-VOC
Product N3	0 g/L	≤100 g/L	Low-VOC
Product O3	0 g/L	≤100 g/L	Low-VOC
Group 7:	**Clear Wood Finishes**		
Product P3	439 g/L	>275 g/L	High-VOC
Product Q3	347 g/L	>275 g/L	High-VOC
Product R3	250 g/L	≤275 g/L	Low-VOC
Product S3	168 g/L	≤275 g/L	Low-VOC
Product T3	57 g/L	≤275 g/L	Low-VOC
Product U3	50 g/L	≤275 g/L	Low-VOC

The overall results for the Phase II testing can be broken down into their categories; PSU, WPCMS, ES, and CWF. The Phase II tests show that the low-VOC coatings perform as wells as or in some cases outperform the high-VOC coatings. For the PSU category, the low-VOC products performed as well as the high-VOC products in terms of enamel holdout, hiding, and overall adhesion. The low-VOC PSUs had superior dry time properties than the higher-VOC PSUs. Tannin bleed through performance varied between the types of wood.

For the WPCMS, two low-VOC sealers performed better than the high-VOC sealers in terms of prohesion, a key durability characteristic, as well as water vapor transmission, and similar in terms of efflorescence. One high-VOC sealer performed best in terms of stain resistance to a variety of products, including brake fluid, transmission fluid, diesel fuel, and motor oil.

For ES, the low-VOC products performed better in terms of stain resistance and direct adhesion to wood. Similar performance characteristics included UV resistance and taber abrasion.

For the CWF, the low-VOC finishes performed better in terms of stain resistance, taber abrasion and UV resistance, and similar in terms of mar resistance, as well as flow/level and sag.

Phase 3

The third and final phase of the UMR study was conducted on Rust Preventative (RP) and Industrial Maintenance Coatings (IMC) and was also completed in November of 2005. Table 11, shown below, lists the coatings tested in Phase III. The UMR raw data for this final phase may be found in Appendix B of this report

Table 11
Phase III UMR Study, RP & IMC

Product Name	Published VOC	VOC Determination	VOC Group
Group 8:	**Rust Preventative Coatings**		
Product A3-p	345 g/L	>100 g/L	High-VOC
Product A3-t	390 g/L	>100 g/L	High-VOC
Product B3-p	340 g/L	>100 g/L	High-VOC
Product B3-t	370 g/L	>100 g/L	High-VOC
Product C3-p	58 g/L	≤100 g/L	Low-VOC
Product C3-t	<50 g/L	≤100 g/L	Low-VOC
Product D3-p	0 g/L	≤100 g/L	Low-VOC
Product D3-t	0 g/L	≤100 g/L	Low-VOC

Table 11 Cont'd
Phase III UMR Study, RP & IMC

Product Name	Published VOC	VOC Determination	VOC Group
Group 9:	**Industrial Maintenance Coatings**		
Product E3-p	163 g/L	>100 g/L	High-VOC
Product E3-i	235 g/L	>100 g/L	High-VOC
Product E3-t	<250 g/L	>100 g/L	High-VOC
Product F3-p	0 g/L	≤100 g/L	Low-VOC
Product F3-i	40 g/L	≤100 g/L	Low-VOC
Product F3-t	66 g/L	≤100 g/L	Low-VOC
Product G3-p	0 g/L	≤100 g/L	Low-VOC
Product G3-i	0 g/L	≤100 g/L	Low-VOC
Product G3-t	0 g/L	≤100 g/L	Low-VOC

The overall results for the Phase III testing can be broken down into two categories, RP and IMC. Specifically for RP coatings, the low-VOC products had superior dry time characteristics, prohesion, and flash rusting. They were similar in terms of hide, taber abrasion, impact resistance, and adhesion (Battele). For IM coatings, the low-VOC products exhibited similar performance in terms of adhesion and superior in terms of UV resistance (gloss retention) and prohesion (gloss retention). The high-VOC IM system performed better in terms of flexibility.

Future Actions

Staff will continue to review and evaluate all coating categories within the Table of Standards for compliance with those limits effective in 2006 and beyond.

AQMD staff will continue work closely with the TAC to review the completed testing by UMR. In addition, staff will pursue further discussions with Cal Poly Pomona to conduct additional evaluations of coatings as selected by the TAC and staff in specific categories. Additionally, the National Paint and Coatings Association is currently in the process of releasing funding for a study that will closely follow the ongoing UMR study to determine performance and long term durability of low and ultra low-VOC coatings.

At the request of Governing Board Chairman William Burke, an ad hoc committee was formed for the purpose of improving communication between the National Paint and Coating Association and AQMD, and providing an open forum for discussion of key regulatory issues. This committee is made up of AQMD Board Members Michael Antonovich and Jan Perry, AQMD Management representatives Dr. Barry Wallerstein and Dr. Laki Tisopulos, and industry representatives Christine Stanley of Ameron and Ron Widner of Benjamin Moore. Steve Sanchez of U.S. Can Co. is an industry alternate. Periodic updates will be given by staff to the Board's Stationary Source Committee.

In addition to these technology assessments, staff will be involved in the following activities over the next year:

1. Meetings with the Ad Hoc Committee as requested;
2. Quarterly meetings and regular conference calls with the TAC;
3. Evaluation of the 2005 CARB Architectural Coatings survey for year 2004 sales;
4. Updates of low- and Super-Compliant- VOC product availability lists;
5. Review results of continued evaluations underway by Essential Public Service Agencies on performance of industrial maintenance coatings;
6. Continuing field audits and contractor surveys of in-use applications of all coatings with future compliance dates in Rule 1113;
7. Monitoring closely the technology advancements to be initiated by the actual paint and coatings manufacturers
8. Compliance audits of Averaging Compliance Plans, and
9. Refinement of performance evaluation criteria for future assessments.

The next Status Report will be presented to the Governing Board in July of 2006.

Recommendation

AQMD staff's research of technical information from many coating manufacturers, coating studies, assessments of sales data, marketing brochures, Material Safety Data Sheets and other sources clearly shows an ever increasing number and volume of products that meet the future proposed limits.

However, with the completion of the most recent technology assessment by the University of Missouri-Rolla-Coatings Institute and in meetings with the TAC, Rule 1113 Ad Hoc Committee and individual coating manufacturers and resin suppliers, AQMD staff recognizes the need to address certain difficulties in meeting the 2006 limits in several categories within the Table of Standards. Virtually all coating categories in Rule 1113 except for high gloss coatings, currently have more than adequate replacement products for solvent-based and other higher VOC counterparts, many of which are well below the current lowest effective limit of 50 g/l VOC. The MWD however, with its uniquely high performance needs, specify certain IM coatings to meet durability times about twice the expected times. As a result, for those users, IM coating technology needs additional flexibility to formulate compliant products that perform to such rigorous standards. Relative to the non-flat high gloss coatings, it appears that most coatings manufacturers have not yet taken full advantage of the most recent technological breakthroughs and some additional time may be helpful for their reformulations.

Therefore, staff is recommending to amend Rule 1113 to include a new category for non-flat high gloss coatings with a VOC limit of 150 g/l effective on July 1, 2006. On July 1,

2007 the limit for this new category will reduce back to 50 g/l VOC, coinciding with the general non-flat category. This suggested amendment would also include the companion category of QDEs that would otherwise reduce to 50 g/l VOC on July 1, 2006.

As part of the rule development process, in addition to the above suggested amendments, staff is proposing to evaluate the partial delisting of TBAc, a solvent that EPA and CARB has determined to be VOC exempt, for certain Industrial Maintenance coatings. AQMD Staff recognizes that the use of this exempt solvent will provide manufacturers with additional flexibility in reformulating products with exceptional performance characteristics while meeting the effective rule VOC limitation of 100 g/l VOC.

Finally, in an effort to offset the emission reduction impacts of the above proposals, staff will consider tightening or accelerating the VOC limits for several categories as suggested by the National Paint and Coatings Association, where low-VOC compliant products are available (i.e. Bond Breakers, Concrete Curing Compounds, Dry Fog Coatings, Traffic Coatings).

Appendices

A. Coatings Analysis

B. AQMD Point of Distribution Product Inventory Survey

C. UMR Coatings Institute Architectural and Industrial Maintenance Coatings Assessment

D. Excerpts from CARB/SCAQMD Reactivity Study

E. Comment Letters Received and Response to Comments

APPENDIX A

Coatings Analysis

Rule 1113 Future Compliant Coatings
2004-2005 Technology Assessment
December 2005

Clear Wood Finishes (≤ 275 g/l)

Coating Company, Product Name, Components	Interior Exterior	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Recommended Substrate/Exposure	Coating Characteristics	Dry Time
AllPro Corporation, 306 Series X-L Poly Urethane Professional WB Floor Finish, Oil-Modified, Oxygen-Cross-linked Acrylic Urethane	I	200	29	450	Hardwood floors such as lobbies, offices, hotels, schools, hospitals, shopping malls, auditoriums, gymnasiums, dance floors	Fast drying, Outstanding resistance to abrasionand heavy floor traffic, withstands food spills and most janitorial supplies	<1 hr touch 1-3 hr recoat
Anchor Paints, 2914 Acri-Lac Clear Gloss, Acrylic Emulsion	I/E	187	26	472	Wood, trim, cabinets, paneling and furniture	Exceptional leveling, fast drying, rapid film hardness development, superior adhesion, exceptional water and detergent resistance	10 min touch 45 min recoat
BEHR, # 15 Log Home Gloss Finish, Acrylate Modified Alkyd Resin	E	150	N/A	200-400	Wood surfaces such as log and timber frame homes, siding, railings, fences	Durable, flexible gloss finish, contains mildewcide and offers UV protection	8-12 hr touch 24 hr recoat
BEHR, # 300 Natural Clear Waterproofing Wood Protector	E	241	N/A	250-300	Unsealed wood decks, fences, siding, and outdoor furniture	Penetrating oil formula, durable, UV protection, contains mildewcide, can be applied to dampwood and low temperatures	24 hr touch 48 hr recoat 72 hr cure
BEHR, # 400 Natural Clear Waterproofing Wood Finish, Acrylate Modified Alkyd Resin	E	245	N/A	250-300	Unsealed wood decks, railings, shakes, shingles, siding, fences, furniture	Penetrating oil formula, durable, UV protection, contains mildewcide, can be applied to dampwood and low temperatures	24 hr touch 72 hr cure
BEHR, # 500 Natural Clear Premium Weatherproofing Wood Finish, Styrene Acrylic Polymers	E	246	N/A	300-350	Unsealed wood decks, railings, shakes, shingles, siding, roofs, fences, furniture	Penetrating oil formula, Silicone based technology enhances waterproofing protection and durability, offers UV protection, contains mildewcide, can be applied to damp wood	24-48 hr touch 72 hr cure
BEHR, # 780 Crystal Clear WB Polyurethane Premium Plus With Style	I	249	N/A	300-400	Top coat over faux-finished, crackled and textured surfaces	Protects from moisture and wear, dries to a durable, non-yellowing, clear, long-lasting matte finish	1 hr touch 3-4 hr recoat
Benjamin Moore, 422 High Gloss, 423 Low Lustre Benwood Stays Clear Acrylic Polyurethane	I	275-283	27-28	350-450	Interior wood surfaces including floors	Clear, durable, non-yellowing, low odor, dries quickly, high resistance to abrasion, protection against alcohol, water, and most household chemicals and stains	1 hr touch 2-3 hr recoat
BonaKemi, Tech Mega Floor Finish Polyurethane WB	I	250	33	500-600	Heavy traffic interior residential & commercial floors	Fast drying, non flammable, excellent flow and leveling, no limited potlife, exceptional build and clarity, gloss, semi-gloss, satin	2-3 hr recoat 7 day cure
Cloverdale Paint, 42324 Timberlox WB Varnish High Gloss, Acrylic/Urethane	I	241	29	330-500	Wood furniture, shelving, cabinets, doors and other woodwork	Excellent non-yellowing and gloss retention properties, excellent hardness, adhesion, durability and wear resistance, resistant to hot and cold water, household chemicals and alcohol	15 min touch 2 hr recoat
Color Wheel Paints & Coatings, 121 Optima Acrythane Satin Varnish, WB Urethane Acrylic	I	225	31	300-500	Wood surfaces such as beams, lumber, trim, doors, cabinets, shelving, furniture	Resistant to moisture vapor, excellent mar resistance, rapid dry, washable, good adhesion	1 hr touch 4 hr recoat
Color Wheel Paints & Coatings, 123 High Gloss Optima Acrythane Spar Varnish, WB Urethane Acrylic	I	227	30	300-500	Wood surfaces such as beams, lumber, trim, doors, cabinets, shelving, furniture	Resistant to moisture vapor, excellent mar resistance, rapid dry, washable, good adhesion	1 hr touch 4 hr recoat
Columbia Paint & Coatings, # 10-670 Gloss Wood Finishes Clear Acrylic Urethane	I	224	32	360	Cabinets, paneling, molding, furniture	Dries tough, water & alcohol resistant, exceptional flow & leveling, easy to sand, high-build	30 min touch 30-60 min. recoat

Rule 1113 Future Compliant Coatings
2004-2005 Technology Assessment
December 2005

Columbia Paint & Coatings, # 10-672 Semi-Gloss Wood Finishes Clear Acrylic Urethane	I	221	31-33	360	Suggested for use on unstained or properly stained interior wood surfaces such as cabinets, paneling, molding, furniture, and other similar items.	Dries to a tough, water-and alcohol-resistant finish. Offers exceptional flow and leveling and is easy to sand. High build properties.	30 min touch 30-60 min. recoat	
Columbia Paint & Coatings, # 10-675 Eggshell Wood Finishes Clear Acrylic Urethane	I	225	32	360	Cabinets, paneling, molding, furniture	Dries tough, water & alcohol resistant, exceptional flow & leveling, easy to sand, high-build	30 min touch 30-60 min. recoat	
Diamond Vogel Paints, Old Masters H2O Acrylic Varnish	I	252	31	248-489	Bare and previously finished wood surfaces	Fast drying, water reducible, non-yellowing, not for floors,	10 min touch 1 hr recoat	
EPMAR, 2700 Sta-Crete Clear Aliphatic Polyurethane, 2	I/E	0	70	300-400	Hospital walls & floors, commercial cement floors, facades, steel and concrete storage tank exteriors, steel & concrete bridges, pump equipment	UV resistant, chemical resistant, cures to a very hard resilient film, excellent adhesion, excellent leveling & flow	5 hr touch 72 hr cure	
EPMAR, Kemiko WB Acrylic Urethane Clear Gloss (44-C) and Clear Satin Sheen (44-CF)	I/E	0	30	300-400	Concrete, plaster, metals, wood trim and furniture, bridges	UV, abrasion and stain resistant, excellent leveling and flow properties	30 min touch 1 hr recoat	
Farwest, X-6697 Semi-Gloss Aquathane Waterborne Floor Finish, Modified Aliphatic Urethane Dispersion	I	186	26-28	250-350	Hardwood floors, kitchen cabinets, coffee tables, wood furniture, table tops, clear wood trim	Non-yellowing, highly durable, stain resistant	30-45 min touch 3 hr recoat	
Fine Paints of Europe, Eurolux Gloss Varnish, Urethane Acrylic	I	126	N/A	492	New or previously varnished wood Floors, stairs, doors, paneling, furniture	Quick-drying, non-yellowing, wear resistant and durable as any solvent borne varnish	45 min touch 4 hr recoat	
Fuhr International, 00 Double Z Self Cross Linking Acrylic Clear Coat	I	0	29	N/A	Cabinets, furniture, moldings, millworks	Resistant to water and various chemicals, UV resistant, excellent durability, anti-sag formulation, fast dry, self-sealing	20 min sand	
Fuhr International, 255 WB Urethane Finish	I/E	57	31	N/A	Floors, high end furniture, doors, cabinets, windows	Fast dry, durable, superior durability and buff ability, self-sealing	10 min touch 30 min sand	
Fuhr International, 275 Multi-Purpose Ultra Clear Urethane	I	120	30	N/A	Tile, concrete, hardwood floorings, high end furniture, doors, millwork, windows, cabinetry	Superior durability, wipeable, buffable	10 min touch 30 min sand	
Fuhr International, 285 Ultra Clear Acrylic Urethane	I	51	27	N/A	Hardwood floors, wood furniture, passage doors, windows, cabinetry	Superior durability, wipe able, buff able	10 min touch 30 min sand	
Fuhr International, 345 WB Industrial Acrylic Varnish	I	77	33	N/A	Kitchen cabinets, furniture, molding, passage doors, millwork, wine racks	Excellent water, chemical and scratch resistance, self-sealing, fast dry, excellent durability, anti-sag resistance	5 min touch 15 min sand	Pigmented versions
Fuhr International, 355 WB Acrylic Varnish	I	75	30	N/A	Kitchen cabinets, furniture, molding, passage doors, millwork, wine racks	Excellent water, chemical and scratch resistance, self-sealing	10 min touch 25 min sand	
Fuhr International, 375 Water Clear Acrylic Varnish	I	50	27	N/A	Kitchen cabinets, furniture, molding, passage doors, millwork, wine racks	Excellent water, chemical and scratch resistance	10 min touch 20 min sand	
Fuhr International, 5000 ZVOC High Solids Clear Coat, WB Self-Sealing Acrylic	I/E	0	38	N/A	Kitchen cabinets, furniture, molding, passage doors, millwork, wine racks	Early block resistance, excellent durability, chemical & water resistance, anti-sag resistance, fast dry, self-sealing	5 min touch 20 min sand	
Fuhr International, 5100 ZVOC Medium Solids Clear Coat, WB Self-Sealing Acrylic	I/E	0	29	N/A	Kitchen cabinets, furniture, molding, passage doors, millwork, wine racks	Early block resistance, excellent durability, chemical & water resistance, fast dry,	5 min touch 20 min sand	
Fuhr International, 5200 ZVOC Low Solids Clear Coat, WB Self-Sealing Acrylic	I/E	0	20	N/A	Kitchen cabinets, furniture, molding, passage doors, millwork, wine racks	Early block resistance, excellent durability, chemical & water resistance, fast dry, uniform sealing	5 min touch 20 min sand	
Fuhr International, 855 Aluminum Oxide Modified Urethane	I/E	57	32	N/A	Wood floors	Fast dry, long lasting, superior durability, wear resistant, self-sealing	4 hr sand 72 hr cure	
Hallman Lindsay Quality Paints, V364, Clearguard Acrylic Urethane Satin Wood Finish	I	240	31	400-535	Its durable finish offers a satin sheen for cabinets, doors, trim, table tops and furniture.	A premium, water-based varnish, clear finish, non-yellowing, resists water, oil, and alcohol.	30 min touch 3 hr recoat	

Hillyard Inc, #HIL0028206 Tip-Off Gym Finish, WB	I	<250	N/A	500-700	Wood floors	Fast dry	1 hr touch 4 hr recoat
ICI Paints (Dulux), 1802-1808 Woodpride WB Aquacrylic Varnish (Satin, Gloss), Acrylic Polyurethane	I	177-196	27	400-500	Wood surfaces such as cabinets, doors, paneling, furniture, floors	Resistant to abrasion, chipping, marring, water, oil, alcohol and blushing, quick dry, durable	1 hr touch 3-4 hr recoat
JFB Hart Coating Inc, HP-146 Clear,WB Aliphatic Polyurethane, Single Component	I/E	175	30	240-400	Steel, aluminum, galvanized metal, concrete/block, masonry, wood	Gloss retention, non-yellowing, good chemical and abrasion resistance, long-term durability, fast-dry, great adhesion, self-leveling, UV protection	8 min touch, 30 min recoat
JFB Hart Coatings Inc, HP-105 Clear, Aliphatic Polyurethane, 2	I/E	0	53	350-450	Steel, aluminum, galvanized metal, concrete/block, masonry, wood	Non-yellowing, UV, stain and chemical resistant, highly scrubable, excellent durability, highly mar resistant, 2 hr pot life	4 hr touch 6-8 hr recoat
Kwal Paint (PPI), 6820 Acrylic Urethane Gloss, Clear	I	275	29	600-800	For both natural and/or stained wood surfaces	High gloss, non-yellowing, quick drying	20-30 min touch 1 hr recoat
Lanco Paints, PV 357-359 Super Polyurethane Clear Varnish	I/E	230	45	600	Wood surfaces such as furniture, doors, woodwork, cabinets, recommended for floors	Non-yellowing, 100% UV resistant, tough and flexible, durable, fast-drying	1 hr touch 12 hr recoat
Lanco Paints, PB 360-361 15 Minute Drying Polyurethane Clear Varnish	I/E	203	45	600	Wood surfaces such as furniture, doors, woodwork, cabinets, recommended for floors	Non-yellowing, 100% UV resistant, tough and flexible, durable	15 min touch 12 hr recoat
Manufacturing & Consulting Chemists Inc, WCX-1XXX Series Clear Topcoats, Acrylic Urethane	I	240	29	300	Wood Cabinets, trim, furniture and most wood products	Tough durable protective coating, excellent block and print resistance, excellent abrasion and mar resistance, fast drying	30 min touch 1 hr recoat
Manufacturing & Consulting Chemists Inc, WHX-1090 High Gloss Acrylic Urethane Clear Topcoats	I	250	27	300	Wood Cabinets, trim, furniture and most wood products	Tough durable protective coating, excellent block and print resistance, excellent abrasion and mar resistance, fast drying	30 min touch 1 hr recoat
Minuteman Intl. (Multi-Clean), Court Shield Final Floor Urethane-Acrylic	I	31	30	800-1000	Wood floors	Hard, durable, scuff/mark resistant, approved by the Maple Flooring Mfg. Association	2 hr recoat
Minuteman Intl. (Multi-Clean), Court Shield ProFloor 100 100% Urethane	I	103	30	900	Wood floors	Durable, resilient, resists scratching and scuffing, non-yellowing, self-leveling	3 hr recoat
Olympic (PPG), 42784 OLYMPIC WB Polyurethane Gloss Finish	I	235	25	500	Hard or soft woods stained, sealed or bare	Excellent protection, color-free, crystal clear	2 hr recoat 72 hr cure
Para Paints, V180 Woodcare, Clear Gloss Acrylic Urethane	I	79	NA	400-450	A top quality one day finish for wood floors, trim, cupboards, furniture, paneling, millwork and toys to protect and beautify with superior durability.	Superior durability.	30-60 min touch 2-4 hr recoat
Para Paints, V190 Woodcare, Clear Satin, Acrylic	I	80	NA	400-450	For wood floors, trim, cupboards, furniture, paneling, millwork and toys.	Superior durability.	1 hr touch 2-4- hr recoat
Pittsburgh Paints (PPG), 77-45 REZ Acrylic Polyurethane Gloss Finish	I	235	27	350-450	New or previously painted, stained or varnished wood surfaces, including low traffic floors	Excellent resistance to abrasion and added protection against alcohol, water and most household chemicals and stains	1 hr touch 3 hr recoat 24 hr cure
Pittsburgh Paints (PPG), 77-49 REZ Acrylic Polyurethane Gloss Finish	I	236	24	350-450	New or previously painted, stained or varnished wood surfaces, including low traffic floors	Excellent resistance to abrasion and added protection against alcohol, water and most household chemicals and stains	1 hr touch 3 hr recoat 24 hr cure
Pratt & Lambert Paints, Z39 Clear Acrylic Latex Varnish Dull Finish	I	250	37	400	Recommended for interior doors, trim, paneling, furniture and cabinets.	A fast drying, low odor and non-yellowing qualities when applied over latex stains, Excellent adhesion and leveling.	30 min touch 4 hr recoat
Resene Paints Limited, D59 Aquaclear Urethane Acrylic Varnish	I	95	N/A	130	Cork, doors paneling parquet particle and fiberboard, timber, veneers	Fair abrasion resistance, good solvent and durability resistance	30 min touch 2 hr recoat 72 hr cure

Rockler, Sam Maloof Oil/Wax Finish 58699/58677	I	0	N/A	N/A	All woodworking surfaces	High durability	24 hr set	
SaverSystems, Defy Interior Acrylic Wood Finish	I	<200	NA	200-500	Perfect for use over natural wood and woods stained with water-based and oil-based stains, log home walls, furniture, trim, doors and cabinets	Dries crystal clear, durable, non-yellowing, fast drying, protects from common household chemicals, abrasion and scuffing	1-2 hr touch 2 hr recoat	
Sherwin Williams, 99 Gym-Plex Floor Finish WB Urethane Clear Gloss	I	200	29-31	320-400	Properly prepared wood and concrete floors	Abrasion resistant, tough, rapid dry, non-yellowing	30 min touch 4 hr recoat 24 hr foot traffic	
Sherwin Williams, T75-500 Series, Sher-Wood Kem Aqua Lacquer, Acrylic latex	I	240	27	386-531	Clear system for finishing furniture, cabinets and a wide variety of wood.	Water reducible, excellent film clarity and mar resistance, very good hardness, block resistance and print resistance, excellent blush resistance.	15 min touch 30 min recoat	
Sico Coatings, 194-090 Crystalex Acrylic Latex Varnish	I	101	24	130-150	For woodwork, furniture, cabinets, beams, wood walls, trim and doors. All species of hard woods or plywood.	Crystal varnish, gloss, transparent, ready and easy to use, low odor, self sealing, dries and hardens rapidly, good resistance, excellent flexibility.	20-30 min touch 2-3 hr recoat	
Sico Coatings, 194-100 Crystalex Acrylic Varnish	I	99	29	NA	Specially recommended on new or bare wooden surfaces or varnished. All species of hard woods or plywood.	Ready and easy to use, protects and beautifies wood, low odor, self sealing, dries and hardens rapidly, excellent flexibility.	20-30 min touch 2-3 hr recoat	
Silvertown Products, Rhinoguard Wood Defense	E	0	30	550	Wood decks, house siding, fences	UV, scuff, water, mildew and fungus resistant contains Gilsonite	24 hr to walk 72 hr recoat	Pigmented versions
Target Coatings, 1000 Series Oxford Ultima Spray Lacquer, WB Acrylic	I	250	30	N/A	Kitchen cabinets, commercial case goods, architectural trim, fine furniture, custom woodworking	Chemical, water and stain resistant, buffable, self-leveling, fast drying, exceptional clarity, outstanding adhesion, exceptional print and block resistance	2 hr recoat	Pigmented versions
Target Coatings, 7000 Series Oxford Hybrid Varnish Oil Varnish/Water Urethane Emulsion	I/E	182	N/A	N/A	Marine and architectural applications	UV Stable durable, fast recoat time, spray or brush friendly, buffable	45 min touch 1½ hr recoat	
Target Coatings, 7500 Oxford Ultima Brushing Varnish WB Hybrid Alkyd Urethane/Acrylic	I	275	35	N/A	Trim, doors, window sills, furniture	Spray or brush friendly, excellent adhesion, fast recoat time, UV stable, water and chemical resistant	1½ hr recoat	
Target Coatings, 8000 Emtech Precatalyzed WB Conversion Varnish, Oil-modified Resins/Acrylic Copolymers	I/E	80	32	500	Interior/exterior architectural trim, cabinetry, furniture, fixtures, yacht interiors	UV stable, water resistant, non-yellowing, scratch resistant	N/A	
Target Coatings, 9000 Series Super-Clear Polyurethane	I	200	30	N/A	Wood surfaces	For use where extreme hardness, clarity and durability are required, chemical and abrasion resistant, buffable, HAPs free	2 hr recoat	
Tried & True Wood Finishes, Danish Oil, Original Wood Finish, Varnish Oil Polymerized Linseed Oil	I	0	N/A	600	Kitchen counters, table tops, doors & windows, trimwork, staircases, cabinets and furniture, paneling cutting boards	High durability, penetrating oil, excellent abrasion and scratch resistance with the varnish oil	1 hr buff 24 hr recoat	
Trinity Coatings Company, LW-800 Series Aqualac Clear WB Urethane	I	254	30	476	Cabinets, paneling, molding, furniture	Dries hard, flexible, chemical and abraion resistant, excellent UV resistant	20-30 min touch 1 hr recoat	
Trinity Coatings Company, F-LW-950 WB Clear Acrylic Urethane	I	228	32	512	Kitchen cabinets, furniture	UV resistant, chemical and abrasion resistant, flexible and hard	20 min dust free 40 min recoat	
Trinity Coatings Company, WV-2000A Series WB Conversion Varnish	I	57	45	728	Kitchen cabinets, furniture, commercial fixtures	Tough durable finish, highly chemical resistant, high build catalized varnish	20-30 min touch 45-60 min recoat	
Valspar (McCloskey), 80-6290 Series Clear Coat, Acrylic Resin	I/E	250	27	400	Properly prepared metal, wood, wallpaper, and plastic laminate surfaces such as cabinets, furniture, walls, entry doors	Scrubbable, stain, grease, fingerprint resistant	1 hr touch 4 hr recoat	

Valspar (McCloskey), 80-6851/6853 Heirloom Crystal Clear Polyurethane, Polyurethane/Acrylic	I	260	25	400-500	Floors, stairs, furniture, cabinets, var tops, woodwork, doors, paneling, trim and crafts	Durable, clear finish, heavy film build, non yellowing, resistant to hot and cold water, alcohol and most household chemicals	15-30 min touch 1-2 hr recoat 12-72 hr cure
Valspar, 93701 Duramax Clear Protector, Acrylic Resin	I/E	250	28	400	Wood, fiberglass, wallboard, metal, concrete, masonry	Scrubbable, stain, grease, oil resistant	1 hr touch 4 hr recoat
Van Technologies Inc, 285 VanAqua WB Acrylic Wood Topcoat	I	228-245	N/A	N/A	Acrylic wood topcoat	Spray, brush, or roll application, fast drying, minimal grain raising	15-30 min touch
Van Technologies Inc, 485 VanAqua WB Topcoat, Aliphatic Urethane	I	190	N/A	N/A	Kitchen cabinets, floors	Scratch and abrasion resistance, excellent adhesion, fast drying, UV resistant, excellent clarity, chemical and water resistant	15-30 min touch ½-1hr sand
Van Technologies Inc, VanEx 680 Exterior Wood Topcoat	E	217	N/A	N/A	Exterior wood topcoat	Flexible, water resistant, excellent adhesion, spray, brush or roll application	24 hr recoat
Vista Paint, 108 Acrithane High Gloss WB Urethane	I	267	29	400-500	Woodwork, cabinets, furniture, paneling	Outstanding water & chemical resistance	30 min touch 2 hr recoat
Vista Paint, TC80 WB Wood Acrylic Lacquer	I	224	30	400	Cabinets, furniture, paneling and other wood substrates	Gloss sheen	20-25 min touch
Wood-Kote Products Inc, 810 Clear and Clean II Gloss Post-Catalyzed Aliphatic Polyurethane-Acrylic Hybrid	I	230	N/A	400-500	Wood floors, doors, trim, paneling and cabinets	Fast drying, excellent hardness, stain and chemical resistant, non-yellowing, requires 2 oz of catalyzt	12 hr working time
Zinsser (Parks Corp), Safe & Simple Clear Poly WB Polyurethane	I	248-249	27	500-600	For normal wear on wood surfaces such as doors, furniture and cabinets	nonflammable, crystal clear finish, never yellows, fast dry, harder than solvent based finishes, resists sun, household chemicals, alcohol, water or detergents	30 min touch 2-3 hr recoat 3-5 day cure
Zinsser (Parks Corp), Safe & Simple Super Poly WB Polyurethane	I	248-249	27	500-600	For use on Harwood floors, doors, table tops, couter tops	Resists heavy wear and high traffic, nonflammable, crystal clear finish, never yellows, fast dry, harder than solvent based finishes, resists sun, household chemicals, alcohol, water or detergents	30 min touch 2-3 hr recoat 3-5 day cure

N/A= Not Available

Clear Wood Finishes-Sanding Sealers (≤ 275 g/l)

Coating Company, Product Name, Components	Interior Exterior	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Recommended Substrate/Exposure	Coating Characteristics	Drying Time
AllPro Corporation, Acrylic Urethane WB Satin Sanding Sealer	I	168	29	300-450	Doors, trim, cabinets, furniture	Fast dry, non-flammable, excellent penetration, minimal grain raising	30 min. touch 2-4 hrs recoat
American Formulating and Manufacturing Safecoat Lock-In Wood Sanding Sealer	I/E	12	N/A	250	New Wood	Reduces grain raising, helps to prevent bleed through of naturally occurring oils, tannin, turps and resins, superior sandability	1 hr touch 2 hr sandable
Cloverdale Paint, 42114 Timberlox Acrylic Sanding Sealer	I	268	20	300-400	New wood furniture, cabinets and trim, paneling, for use under alkyd and polyurethane varnishes	fast drying, non-yellowing, penetrates porous wood surfaces, sands easily	10 min touch 1 hr recoat
Coronado Paints, CLS 3122-11 WB Acrylic Lacquer Sanding Sealer	I	168	29	N/A	Bare or stained wood doors, trim, paneling, furniture, cabinets, fixtures	Dries quickly, sands easily, good hold out under all gloss levels of clear finish	30 min touch 2-4 hr sand 7-10 day recoat
Diamond Vogel Paints, Old Masters H2O Acrylic Sanding Sealer	I	181	30	240-481	For bare or stained Interior Wood Surfaces	Non-yellowing, fast dry, not for floors	10 min touch 30 min. recoat

Fuhr International, 365 WB Acrylic Clear Sanding Sealer	I/E	50	27	350-450	Various wood surfaces	Great blocking resistance, fast drying, excellent mar resistance, high hardness, minimal to no grain raising	5 min touch 15 min sand
Fuhr International, 5300 ZVOC Sanding Sealer	I/E	0	20	350-450	Various wood surfaces	Excellent penetration , fast drying	5 min touch 15 min sand
Fuhr International, 5350 ZVOC High Viscosity Sanding Sealer	I/E	0	20	350-450	Various wood surfaces	Excellent penetration, fast drying	5 min touch 15 min sand
Fuhr International, 655 Universal Sanding Sealer	I/E	38	15	350-450	Various wood surfaces	Deep penetrating, fast drying, brushable	5 min touch 15 min sand
Glitsa American Inc, C16021 Snap Dry WB Sealer, Acrylic Polymer Dispersion	I	261	N/A	400-500	Bare wood	Non-yellowing, fast dry, excellent leveling	1.5 - 2.5 hr recoat
Hillyard Inc, #HIL0032006 WB Sanding Seal & Primer	I	<200	N/A	600-800	Wood floors	Fast dry	1 hr touch 4 hr recoat
Manufacturing & Consulting Chemists Inc, WC-2044 Sanding Sealer WB Acrylic	I	235	28	300-400	Wood cabinets, trims, furniture	Powders well, fast drying, for open grain wood surfaces	30 min. touch 1 hr recoat
Manufacturing & Consulting Chemists Inc, WCX-2022 Sanding Sealer WB Self Crosslinking Acrylic	I	265	29	300-400	Wood cabinets, trims, furniture	Powders well, fast drying, for close grain wood surfaces	30 min. touch 1 hr recoat
Rodda Paint Company, 506600 Aqua Lac Clear Sanding Sealer, WB Acrylic	I	124	33	200-300	Wood	Excellent flow, build, and sanding properties, non-toxic	10 min touch 30 min sand
Spectra-Tone Paint Corporation, #045 Spectra-Lac Water Reducible White Pigmented Sanding Sealer, Styrene/Acrylic Copolymer Emulsion	I	245	36	350-450	Cabinet work, molding, doors, trim, jambs.	Fast dry, easily sanded, good hiding and enamel holdout	20 min touch 45 min sand 2 hr recoat
Target Coatings, 8800 Emtech WB Univeral Sealer	I/E	200	40	N/A	Fine furniture construction, residential and commercial architectural finishing, marine application	UV stable, non-yellowing, exceptional adhesion to woods with high oil content, excellent water resistance	1 hr sand & recoat
Trinity Coatings Company, SW-500 Nitro Aqualac Clear WB Lacquer Sealer	I	107	27	450	Cabinets, paneling, molding, furniture	Acrylic emulsion polymer, durable finish, stearated for easy sanding, water and alcohol resistant finish	15-20 min touch 30-40 min sand 30-40 min recoat
Vista Paint, 107 Acrithane Sanding Sealer	I	242	28	400-700	Woodwork, cabinets, furniture, paneling	Excellent durability, water & chemical resistant, minimal grain raise, fast dry	1 hr touch 2 hr recoat
Vista Paint, TC10 W/B Sanding Sealer	I	241	30	850-950	Woodwork, cabinets, furniture, paneling	Excellent durability, water & chemical resistant, minimal grain raise, fast dry	1 hr touch 2 hr recoat
Zinsser (Parks Corp.), Safe & Simple WB Sanding Sealer	I	248-249	26	400	For woods such as hardwoods, softwoods, plywood, paricle board or masonite	Seals wood pores completely, sanding not necessary if topcoated within 6 hours	30-45 min touch 36 hr cure for oil

N/A= Not Available

Many of the following pigmented wood coatings are not pigmented lacquers by definition but would serve as replacements.

Pigmented Lacquers (≤ 275 g/l)

Coating Company, Product Name, Components	Interior Exterior	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Recommended Substrate/Exposure	Coating Characteristics	Drying time to recoat
BEHR, # 401, 402, 403 Pigmented Waterproofing Wood Finish, Acrylate Modified Alkyd Resin	E	245	N/A	250-300	Unsealed wood decks, railings, shakes, shingles, siding, fences, furniture	Penetrating oil formula, durable, UV protection, contains mildewcide, can be applied to dampwood and low temperatures	24 hr touch 72 hr cure

Fuhr International, 9100 Series Universal Acrylic Topcoat Opaque	I	25	35	N/A	Shutters, trim, doors, molding, cabinetry, furniture	Excellent mar resistance, anti-sagging, fast drying, high hardness	8 min touch 30 min sand
JFB Hart Coating Inc, HP-146 Custom Colors, WB Aliphatic Polyurethane, Single Component	I/E	135-175	30	240-400	Steel, aluminum, galvanized metal, concrete/block, masonry, wood	Gloss retention, non-yellowing, good chemical and abrasion resistance, long-term durability, fast-dry, great adhesion, self-leveling, UV protection	8 min touch, 30 min recoat
Manufacturing & Consulting Chemists Inc, WCX-3XXX Series Pigmented Topcoats WB Acrylic	I	250	29-31	300	Furniture, cabinets and most wood products	Tough durable protective coatings, excellent block and print resistance, excellent abrasion and mar resistance, fast dry	30 min touch 1 hr recoat
Silvertown Products, Rhinoguard Furniture Stain and Finish	I	0	N/A	N/A	Furniture, doors, wood beams	Fade Resistant, resistant to many oils and greases, contains Gilsonite	24 hr recoat
Silvertown Products, Rhinoguard Wood Defense	E	0	30	550	Wood, decks, siding	UV, scuff, water, mildew and fungus resistant contains Gilsonite	24 hrs to walk 72 hrs recoat
Spectra-Tone Paint Corporation, #296 Spectra-Lac Water Reducible White Lacquer, Styrene/Acrylic Copolomer Emulsion	I/E	250	38	400-450	For use on wood trim, molding and designer furniture, new or previously painted wood, masonry, metal, plaster or drywall surfaces.	Finely dispersed titanium dioxide to provide maximum hiding and still exhibit excellent flow, very hard and durable, good color retention, block resistance, water soak resistance, blister, alkali, fume and fade resistance.	20 min touch 2 hr recoat
Trinity Coatings Company, LW-840 Nitro Beige WB Urethane	I	194	34	547	Furniture, store fixtures, kitchen cabinets, metal parts	Acrylic urethane, flexible, hard, chemical and abrasion resistant, multiple colors	15-30 min touch 35-45 min handle 1 hr recoat
Trinity Coatings Company, F-LW-4000 Series Aqualac White WB Lacquer	I	100	34	549	Cabinets, paneling, molding, furniture	Acrylic emulsion polymer, durable finish, dries tough, water and alcohol resistant, UV stabilized for a non-yellow finish	15-30 min touch 35-45 min handle 35-45 min recoat
Trinity Coatings Company, LW-4500 Series WB Quick Dry Lacquer	I	90-116	31	451-505	Properly prepared wood or metal surfaces sall décor items, home furnishings, picture frames,	Acrylic emulsion polymer, durable finish, dries tough, water and alcohol resistant, high build, multiple colors	13-30 min touch 1 hr recoat

N/A= Not Available

Floor Coatings (≤ 50 g/l)

Coating Company, Product Name, Components	Interior Exterior	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Recommended Substrate/Exposure	Coating Characteristics	Dry Time
Andek, Polafloor Colorcoat WB Acrylic Copolymer	I/E	50	N/A	200-250	Firm painted surfaces, concrete, wood	Resists UV, mildew, chemical attack; has alkali resistance, protects substrate from wear, water, and chemical attack, fast dry	N/A
Degussa (ChemRex Inc/Sonneborne), Tuf-trac Tennis Green	I/E	0	47	70-125	Asphalt and Concrete tennis courts, playgrounds, arenas, walkways, balconies, steps, bike paths	Durable, nonglaring, slip-resistant safety flat finish, resists weathering	4 hr recoat 24-36 hr cure
Farwest, #2001 Series, Deck-Safe Waterborne Pigmented Acrylic Deck Coatings	E	37	46	100	For use on wood, steel, aluminum or concrete/masonry surfaces such as decks, porches, walkways, ramps, steps, boat decks, bridgeways	Withstands rough weather, non-slip aggregate coating, various colors	1 hr touch 24 hr recoat
Florock Seamless Systems, System 4700 High Speed Epoxy, 2	I	0	100	100	Ideal for use over existing coatings that are well-bonded and properly prepared.	An economical, 2 component, 100% solids epoxy concrete floor resurfacer. Cures quickly for durability, contains no solvents and is low odor.	1-1/2-2 hr touch 3-4 hr recoat
Gaco Western Inc, GacoFlex U-62 Urethane, 2	I/E	0	100	1600	High-build base and finish for mechanical room floors, walking decks and vehicular traffic decks on floors of plywood, concrete and metal	Good hydrolytic stability, good resistance to inorganic bases, acids and hydrocarbon solvents, fair resistance to oxygenated and chlorinated solvents, weather and wear resistant, tough	8 hr set 18-24 hr foot traffic +24 hr vehicle traffic

ITW Resin Technologies, IMPAX 650 SL Epoxy, 2	I	0	100	160	Self-leveling floor coating for concrete/wood and painted surfaces	Full gloss finish, high chemical resistance	8 hr recoat 24 hr foor traffic 5 day cure
Key Resin Company, 420 Key 100% Solids Urethane Coating, 2	I	<25	>98	160	100% solids, polyurethane floor coating designed to provide high gloss, UV stable, chemical resistant protection, clear or pigmented.	Low odor for use in occupied areas, chemical & stain resistant, easy application, UV stable.	4-5 hr touch 12-24 hr recoat 7 day full cure
Key Resin Company, 520 100% Solids Epoxy Coating, 2	I	0	100	160	Pigmented epoxy floor coating designed to provide high gloss, chemical resistant protection. Should be used wherever a high build, corrosive resistant, protective floor coating is required.	Low odor for use in occupied areas, chemical & stain resistant, easy application, provides a smooth, high gloss finish.	10-12 hr touch 12-16 hr recoat 5 day full cure
Key Resin Company, 625 Key Chemical Resistant Epoxy Coating, 2	I	0	100	100	100% solids epoxy and modified novolac epoxy floor coating designed to provide high chemical resistant protection, available in multiple colors.	Superior chemical & stain resistance, easy application, bonds well to cool, damp substrates, low odor for use in occupied areas, suitable for immersion and wet process flooring applications.	6-8 hr touch 12-16 hr recoat 5 day full cure
KST Coatings, LLC (Thoro), Kote-a-Deck, Acrylic Latex	E	28	N/A	100	Decking, porches, patios and stairs made of wood, concrete, metal, asphalt, and fiberglass substrates	Waterproofs, elastomeric, skid resistant, won't crack or peel, excellent UV resistance	N/A
Monopole Inc, Monochem Aquaseal W20	I/E	0	20	200-500	Horizontal concrete floors, decks, docks, ramps and pavements	Penetrating, acrylic-modified inorganic silicate-base solution. Resists penetration of oil & chemicals and the effects of salt and water, breathable abrasion-resistant	30 min touch 24 hr foot traffic 7 day cure
PolySpec, TuffRez 236 Polyurethane Coating, 3	E	4	66	350	Recommended uses include laboratories, hospitals, educational facilities, animal holding areas, chemical processing plants and marine living quarters.	Zero VOC, low odor, ideal for use in confined spaces where occupants are present, UV stable, non-yellowing, resists attacks by most acids, alkalies, detergents, lubricating oils, solvents and chemicals, excellent abrasion resistance.	3 hr recoat
Resene Paints Limited, D313 Non-Skid Deck & Path	I/E	50	N/A	83-163	Bitumen, concrete decks	Excellent abrasion and durability, high film build, excellent traction	1 hr touch 3 hr recoat 24 hr cure
Resene Paints Limited, RA43 Aquapoxy for Flooring, WB Epoxy 2	I/E	50	N/A	457	Bilumen, dairy, food processing garage, meat work floors, primed steel	Excellent abrasion and durability resistance, excellent solvent resistance, fair acid resistance, excellent alkali resistance	10 hr touch 24-120 hr recoat
Seal-Krete Inc, Seal-Krete Floor-Tex Proformance, Acrylic, Non-Slip Textured Coating	I/E	0	70	200	Concrete and masonry survaces such as walkways, patios, pool decks, stairs, balconies, ramps, driveways	Durable, anti-skid, waterproof, weather-resistant, impact resistant, oil resistant, chlorine resistant, UV resistant	6 hr recoat 24 hr foot traffic 48 hr vehicle traffic
Sierra Performance (Rust-Oleum), S-40, S-42 Epoxy Concrete Enamel, 2	I/E	0	45-52	90-175@ 3½-8 mils	Concrete floors in areas of light to medium vehicle traffic occasional chemical spills	Excellent durability, good chemical resistance against mild corrosive and chemical environments	30 min touch 1-2 hr recoat 72 hr cure
Tamms Industries, Duralkote 240, High Build Flexible Epoxy, 2	I	0	100	100-150	High performance maintenance coating. Ideal for use in truck/auto bay areas, food service plants, water treatment plants, breweries and all areas where easy clean up is essential.	High build flexible epoxy coating, two component, designed for use ase a wall and floor coating. Excellent chemical and abrasion resistance.	4-6 hr tackfree
Thortex America, Inc., Floor-Tech H.B. Epoxy Coating, 2	I	0	100	53	Designed for use for long term floor protection. Ideal for use in dairies, breweries, canteens, food factories, pharmaceutical plants and warehouses, etc.	High performance solvent free ceramic reinforced heavy duty coating, simply sate and easy to use, optimal level of adhesion, abrasion, impact and chemical resistance.	6 hr touch 7 day full cure

Thortex America, Inc., Floor-Tech W.B. Epoxy Finish, 2, Water-Based	I	0	50	108	Designed for use as a cost effective durable floor protection system. Ideal system for concrete, quarry tiles or previously painted surfaces where a durable easy clean surface is required.	High performance water-based epoxy ceramic reinforced coating, optimal adhesion, abrasion, impact and chemical resistant and durable.	4 hr touch 7 day full cure
Thortex America, Inc., Floor-Tech W.B.X. Epoxy Coating, 2, Water-Based	I	44	50	107	Designed for use on most floor surfaces.	High performance fast curing, self priming, low gloss coating system, excellent adhesion and durable.	1-2 hr touch 7 day full cure

N/A= Not Available

Industrial Maintenance Coatings (≤ 100 g/l)

Coating Company, Product Name, Components	Primer/Sealer Intermediate Topcoat,	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Recommended Substrate/Exposure	Coating Characteristics	Dry Time	Pot Life @70 deg./ Shelf Life
Ameron International, Amercoat 133, Epoxy Coating 2	P	72	100	200-401	Tank and water pipe lining, repair tank bottoms including water, fuel, selected chemical tanks, repair pitted steel surfaces	Excellent chemical, solvent and water immersion resistance	24 hr hard dry 10-30 hr recoat 14 day final cure	2 hr/ 1 yr
Ameron International, Amercoat 182, Spash Zone Barrier Coating, Epoxy, 2 (resin + cure)	P/T	1	100	1604	steel in fresh or salt water, underwater pipes, pilings, bracings, water line structures, and retaining walls	Can be applied and cures underwater, excellent cathodic disbondment resistance, excellent water, chemical and solvent resistance, effective corrosion barrier	5 hr set 24-72 hr cure	1 hr/ 1 yr
Ameron International, Amercoat 333, Epoxy Coating 2	T	71	100	200	Ballast, fuel, selected chemical tanks, repair pitted steel structures	Excellent chemical, solvent and water immersion resistance, edge retentive	24 hr hard dry 10-30 hr recoat 7 day final cure	2 hr/ 1 yr
Ameron International, Amerlock Sealer, Epoxy 2	S	0	100	1069	Penetrating sealer for steel, concrete, galvanizing, stainless steel, aluminum and old coatings	Solvent free, penetrates rust, adheres to aged coatings, resists high humidity, excellent corrosion resistance	12 hr touch 24 hr recoat	1 hr/ 1 yr
Ameron International, Dimetcote 21-5, WB Inorganic-Zinc Silicate 2 (Liquid + Powder)	P	0	91	336	Steel bridges, cranes, offshore platforms, fabricated structures exposed to severe weathering, marine environments or moderate chemical fumes	Fast drying, rapid water resistance, resistant to mudcracking	3 min touch 6 min recoat 8-24 hr cure 72 hr topcoat	8 hr/ N/A
Ameron International, Nu-Klad 100A, Epoxy Surfacer, 3	I/T	4	100	28-43	Mining and metal finish operations, chemical processing plants, power facilities, sewage and waste water treatment plants, pulp and paper, textile and steel mills	Solvent free surfacer that resists wide range of acids, alkalies and solvents. With stands heavy traffic and abrasion. Excellent adhesion	10 hr touch 28 hr recoat	1 hr/ 1 yr
Ameron International, Nu-Klad 103N, Epoxy Novolac Floor Coating, 2	T	6	100	160	Concrete floors in food and beverage processing facilities, electronic equipment plants, industrial, commercial, laboratory, pharmaceutical, power and watewater/sewage plants	Chemical resistance, high gloss	24 hr walk 7 day cure	40 min/ 1 yr
Ameron International, Nu-Klad 105A, Epoxy 2	P/S	0	100	250-400	Concrete surfaces at chemical processing plants such as power and sewage treatment; finishing operations such as mining and metal; mills such as pulp/paper, steel and textile	Solvent free epoxy for concrete that has been water-cured and properly prepared. Can be used as a curing compound. Absorbs into concrete	17 hr touch 24 hr recoat	1 hr work time/ 1 yr
Ameron International, Nu-Klad 120A, Epoxy Surfacer, 3 (resin, cure, powder)	I	0	100	88	Concrete surfaces at chemical processing plants such as power and sewage treatment; finishing operations such as mining and metal; mills such as pulp/paper, steel and textile	Spreadable, self-leveling epoxy concrete surfacer which yields a smooth, cleanable, chemical-resistant floor	3 hr touch 16 hr recoat 2 day cure	¾ hr/ 1 yr

Ameron International, Nu-Klad 126, Epoxy Floor Coating 2	I/T	38	100	160	Concrete surfaces at chemical processing plants such as power and sewage treatment; finishing operations such as mining and metal; mills such as pulp/paper, steel and textile	Excellent adhesion and abrasion resistance, impact resistant, high-gloss	6 hr touch 24 hr walk 7 day cure	40 min/ 1 yr
Ameron International, Nu-Klad 127, Epoxy Coating 2	P/S	0	100	267	Concrete surfaces at chemical processing plants such as power and sewage treatment; finishing operations such as mining and metal; mills such as pulp/paper, steel and textile	Seals porous concrete, reduces bubbling of self-leveling topcoats, new concrete or refurbishment, smooths rough surface	5 hr touch 6-24 hr recoat 7 cure	30 min/ 1 yr
Ameron International, PSX 758, Siloxane Surfacer, 3 (resin, cure, powder)	I/T	12	100	2935 per mil	Primed concrete floors in chemical processing, power, sewage and waste treatment plants; pulp and paper, textile, and steel mills; mining and metal finishing operations. Suitable for secondary containment	Resists a wide range of acids, alkalies and solvents, excellent adhesion, abrasion resistant, resists cracking and lifting	10 hr touch 24 hr light traffic 3 days recoat	2 hr/ 1 yr
Andek, PolaFloor Epoxy Topping, 2	T	0	N/A	30@200 mils	Floors in chemical plants, machine shops, plating works, breweries	Fast setting, rapid strength build, extreme resistance to wear, impact and chemical attack	4 hr work time 12 hr initial set 3 day cure	40 min/ 12 months
Andek, PolaFloor P.U.R. Brushable, Kevlar Modified Urethane 3	T	0	N/A	50@20 mils	Industrial floors, tanks, pits, gullies, secondary containment	Highly impermeable to fluids, resists the leaching of chemicals through the coatings, tough wear-resistant surface that resists impact and abrasion	40 min work time 24 hr foot traffic 5 day full cure	20 min/ 12 months
Andek, Wearcoat 1802 Aliphatic Urethane, 2	P/T	0	N/A	400	Concrete, masonry, metal, and stone	Excellent hydrolytic stability, UV resistance, high tensile strengh, withstands heavy use and environmental attack, resists color fade	4 hr tack free 8 hr cure	2½ hrs/ 12 months
Arcor Epoxy Technologies, Arcor EE-11 Primer, Amine Cured Epoxy, 2	P	0	100	23-80	For steel and metal alloys in immersion service. Ideally suited for aggressive water service. Contains zinc-phosphate.	Corrosion inhibiting, excellent water and alkali resistance, good resistance to organic solvents	6-12 hr tack free 2-12 hr recoat	40 min/ 3 yrs
Arcor Epoxy Technologies, Arcor EE-101, Amine Cured Epoxy Novolac, 2	P/T	0	100	160	Designed for use in the most aggressive chemical and high temperature environments, on ferrous and non-ferrous metals and concrete.	Excellent water, chemical and alkalik resistance, good abrasion and flexibility, clear.	1-8 hr recoat 36 hr full cure	15 min/ 2 yrs
Arcor Epoxy Technologies, Arcor EE-111, Amine Cured Epoxy Novolac, 2	T	0	100	20-80	Suitable for immersion and non-immersion service, high functionality epoxy for secondary containment areas.	Excellent Chemical resistance, very good abrasion resistant and flexibility.	2-8 hr tack free 1-4 hr recoat	15 min/ 2 yrs
Arcor Epoxy Technologies, Arcor EE-121, Amine Cured Epoxy Novolac, 2	T	0	100	26-80	Designed specifically for an aggressive chemical and high temperature resist coating, chemical resistant on ferrous and non-ferrous metals for full immersion and concrete for secondary containment.	Excellent chemical resistance, very good abrasion resistant and good flexibility.	1-3 hr tack free .5 - 1 hr recoat	25 min/ 2 yrs
Arcor Epoxy Technologies, Arcor EE-951, Amined Cured Epoxy Novolac, 2	T	0	100	For patching	Designed particularly as a rebuilding material for metals in hghly aggressive chemical and temperature immersion service. Ideally suited for resotration or cladding material for corrosion and abrasion protection.	Excellent chemical resistant and abrasion, good flexibility, corrosion protection.	1-2 hr recoat 36 hr full cure	25 min/ 2 yrs
Arcor Epoxy Technologies, Arcor S-15, Amine Cured Epoxy, 2	P/T	0	100	80-160	Suitable for immersion and non-emmersion service. Suitable for large tank linings and secondary containment concrete. Suitable for hand or spray application on metals or concrete.	Chemical resistant on ferrous metals and concrete, excellent flexibility.	6-14 hr tack free 2-14 hr recoat	35 min/ 3 yrs

Arcor Epoxy Technologies, Arcor S-16, Amine Cured Epoxy, 2	P/T	0	100	20-80	Designed as a protective coating for metals in immersion service. Ideally suited for aggressive water service.	Chemical resistant, flexible coating.	5-8 hr recoat 3 day full cure	30 min/ 3 yrs
Arcor Epoxy Technologies, Arcor S-20, Amine Cured Epoxy Novolac, 2	T	0	100	29252	Designed as a protective coating for metals in highly aggressive environments especially caustics and acids..	Abrasion & chemical resistant, low friction coating.	5-8 hr recoat 3 day full cure	35 min/ 3 yrs
Arcor Epoxy Technologies, Arcor S-30 Primer, Amine Cured Epoxy Novolac, 2	P	0	100	23-80	Designed as a corrosion inhibiting primer for steel and metal alloys in immersion service. Ideally suited for aggressive water and/or salts or mechanical damage to the coating.	Corrosion inhibiting, excellent water and alkali resistance, good resistance to organic solvents. Contains zinc-phosphate.	6-12 hr tack free 2-12 hr recoat	40 min/ 3 yrs
Arcor Epoxy Technologies, Arcor S-30, Amine Cured Epoxy Novolac, 2	P	0	100	27-80	Designed as a corrosion inhibiting primer for steel and metal alloys in immersion service. Multi functional chemistry produces a fine multipurpose coating suited for moderate acid and caustic service, and elevated service temperatures.	Corrosion inhibiting, excellent water and alkali resistance, good resistance to organic solvents. Contains zinc-phosphate.	6-10 hr tack free 2-10 hr recoat	25 min/ 3 yrs
Arcor Epoxy Technologies, Vicor EE-70, Amine Cured Epoxy, 2	P/T	0	100	20-80	For tanks, pipe, flooring, acid/caustic splash xones, potable water, food contact areas, wastewater tanks, sewer pipe, petrochemical tanks, structural steel.	Moisture insensitive, good chemical & abrasion resistant.	5-8 hr recoat 3 day full cure	35 min/ 3 yrs
Arcor Epoxy Technologies, Vicor EE-75, Epoxy Novolac, 2	P/T	0	99.6	80	Aggressive chemical secondary containment zreas, industrial floorings.	Excellent chemical resistance, very good abrasion resistance, good flexibility.	2-14 hr recoat 1 day full cure	35 min/ 3 years
Arcor Epoxy Technologies, Vicor EE-78, Amine Cured Epoxy, 2	T	0	100	50-150	Floor coating, ideal for metals, concrete and wood.	Low viscosity, impact resistant, good chemical resistance and very good abrasion resistance, water insensitive.	8-14 hr recoat 7 day full cure	35 min/ 3 yrs
Arcor Epoxy Technologies, Vicor EE-79, Epoxy floor leveler, 2	S	0	100	150	Concrete flooring, secondary containment, acid/caustic splash zones, hazardous waste storage areas.	Low viscosity, seals cracks and fills pits, smooth finish, fair to good chemical resistance, very good abrasion resistance and flexibility.	5-6 hr recoat 3 day full cure	30 min/ 3 yrs
Arcor Epoxy Technologies, Arcor Arcrete, Amine Cured Epoxy, 2	P	0	100	160	Designed for use in repair of concrete in areas exposed to aggressive chemicals. Secondary containment, flooring, concrete tank supports, chemical drain troughs.	Fair to excellent chemical resistance, very good abrasion resistant and fair flexibility.	6-12 hr recoat 3 day full cure	30 min/ 3 yrs
Arcor Epoxy Technologies, Arcor Spraythane, Amine Cured Epoxy/urethane, 2	T	0	100	27-80	Designed as a high resilience, high tear resistant, high impact resistant coat that is ideal to combat cavitation and abrasion and is compatible with epoxy coatings.	Chemical & abrasion resistant, excellent flexibility.	6-12 hr recoat 3 day full cure	55 min/ 3 yrs
Arcor Epoxy Technologies, Vicor EE-10, Amine cured Epoxy Novolac, 2	P/T	0	100	160	For aggressive chemical tank linings and secondary containment areas, tough chemical resistant coating on ferrous and non-ferrous metals and concrete.	Excellent for 98% sulferic acid immersion, coating suitable for immersion, chemical resistant, very good abrasion resistance and flexibility.	3-14 hr recoat 7 day full cure	25 min/ 3 yrs
Arcor Epoxy Technologies, Vicor EE-11, Amine Cured Epoxy Novolac, 2	T	0	100	20-80	Suitable for immersion and non-immersion service, particularly in aggressive acid and alkali environments, chemical resistant coating on ferrous and non-ferrous metals and concrete.	Very good abrasion and flexibility, chemical resistant.	6-14 hr tack free 2-14 hr recoat	25 min/ 3 yrs
Arcor Epoxy Technologies, Vicor EE-15, Amine Cured Epoxy Novolac, 2	P/T	0	100	20-80	Suitable for immersion and non-immersion service, for ferrous metals and concrete.	Excellent chemical resistant and very good flexibility.	6-14 hr tack free 2-14 hr recoat	25 min/ 3 yrs
Benjamin Moore, M04 Acrylic Metal Primer	P/I/T	51	40	320	Metal including galvanized, barrier coat over zinc coated surfaces, damp surfaces, poured or cast concrete and brick	Rust inhibitive, fast dry, excellent adhesion	30 min touch 2 hr recoat	Single Component

Benjamin Moore, M35 Epoxy Penetrating Bonding Sealer/Finish, 2	P/T	2	100	200-400 @4-8 mils	Tightly adhering rusted surfaces, concrete, as a bonding primer over galvanized steel, stainless steel, zinc, chrome, copper, breas, aluminum, porcelain, formica	Deep penetration, excellent adhesion, campatible with a variety of top coats, forms necessary foundation to support high performance top coats	4 hr touch 16 hr recoat 7 day cure	1-1½ hr pot life
Benjamin Moore, M40 100% Solids Epoxy Floor Coating 2	T	0	100	200	Concrete floor coating for all types of industries	Excellent abrasion resistance, excellent color retention, self-leveling, resists most chemical stains, non–flammable, high build	8 hr touch 12 hr recoat	30 min pot life
Benjamin Moore, M79/M80 100% Solids Epoxy Novolac 2	I/T	0	100	150@11 mils	Concrete floor coating for all types of industries	Excellent abrasion resistance, excellent color retention, self-leveling, resists most chemical stains, non–flammable, high build	8 hr touch 12 hr recoat	30 min pot life
Blome International, EC-200, High Performance Vinyl Ester Coating, 2 or 3	I/T	57	85	23 to 40 @ 35 to 60 mils	For secondary containment structures, concrete floors, and other applications.	Chemical resistant and high durability.	12 hr cure	30-35 min/ 3 months
Blome International, EC-56LV, High Performance Polysulfide Coatings, 2 or 3	I/T	4	100	11 to 24@ 60 to 70 mils	For secondary containment structures, concrete floors, and other process applications.	Chemical and water resistant coating and lining system, good flexibility	36 hr cure before service	30-35 min/ 6 months
Blome International, EC-66, High Performance Epoxy Coating, 2 or 3	I/T	2	100	12 to 27@ 60 to 135 mils	For concrete floors, cooling tower basins and other applications which demand flexibility for bridging moving joints and cracks.	Chemical and water resistant, good flexibility.	36 hr cure before service	30-45 min/ 12 months
Blome International, EC-80, High Performance Epoxy Coating, 2 or 3	I/T	0	100	21 to 46@ 35 to 75 mils	For secondary containment structures, concrete floors, and other process applications.	Chemical resistant, and durable. Can be reinforced to have high impact and thermal shock resistance.	12 hr cure	25-35 min/ 12 months
Blome International, EC-8601, Multi-Purpose Clear Epoxy, 2	S/T	2	100	160-320	Used as a concrete sealer and finish, as a primer under certain floor coatings and toppings, as a binder for silica aggregate blend underlayments and as a binder and sealer for color quartz floors.	Non-yellowing, excellent wetting characteristics.	7 days final cure	30-35 min/ 12 months
Blome International, EC-8602, Multi-Purpose Pigmented Epoxy, 2	S/T	2	100	160-320	Used as a concrete sealer and finish, as a primer under certain floor coatings and toppings, as a binder for silica aggregate blend underlayments and toppings.	Non-yellowing, excellent wetting characteristics, good chemical resistance, gloss retention and superior physical properties.	7 days final cure	20-30 min/ 12 months
Blome International, EC-90, High Performance Novolac Epoxy, 2 or 3	I/T	0	100	21 to 46@ 35 to 75 mils	For secondary containment structures, concrete floors, and other process applications.	Chemical resistant and good durability.	12 hr cure	24-30 min/ 12 months
Blome International, EC-R540, Moisture Tolerant Epoxy System, 2	P/S/T	0	100	N/A	For brick and tile mortar, coating damp floor surfaces, for concrete surfaces, lining below grade concrete pits, manholes and wet wells, uder water repair.	Moisture tolerant epoxy system, two component epoxy system that has a high degree of moisture tolerance. Increased crack and impact resistance.	4-6 hr touch	30-40 min/ 12 months
Blome International, EC-R590, Multi-Purpose Epoxy System, 2	P/S/T	1	100	N/A	For floor toppings, casting of equipment footings, concrete surfaces, lining below grade concrete pits, manholes and wet wells.	Exhibits crack and impact resistance.	24 hr recoat	30-40 min/ 12 months
Carboline, Carboguard 554 High Solids Epoxy, 2	I/T	45	92	147@10 mils	Hard, tile-like finish for institutional and industrial steel, concrete, drywall and plaster	Excellent abrasion and moisture resistance, excellent stain and adhesion resistance	8 hr touch 8 hr recoat 7 day cure	45 min/ 12 months
Carboline, Carboguard 1207 Polyamido-Amine Epoxy, 2	P	14	98	1572 per mil	Steel and concrete surfaces	Superior abrasion resistance, excellent resistance to aerated seawater and other chemicals, excellent immersion performance	16 hr touch 16 hr recoat 7 day cure	90 min/ 3 yrs
Carboline, Carboguard 1209, Polyamido-Amine Epoxy, 2	P	96	88	1411 per mil	Dense, highly impermeable glass flake filled coating used for protecting steel and concrete for marine, offshore, petrochemical, pulp & paper and other aggressive environments.	Excellent abrasion and chemical resistance, outstanding impermeability, single coat, self-priming capabilities, VOC compliant.	8 hr dry 7 day recoat 7 day cure	2 hr/ 36 months

Carboline, Carboguard 1340 Polyamido-Amine Epoxy, 2	P/S	95	98	1572 per mil	Concrete	Flexible, retards the escape of moisture from green concrete	12 hr touch 14 day recoat 6 day cure	45 min/ 3 yrs
Carboline, Carbozinc 11 WB Inorganic Zinc Primer	P	0	N/A	321	Protects steel galvanically	Excellent corrosion protection, good resistance to salting, fast cure	30 min touch 18 hr topcoat	8 hrs/ 2 yrs
Carboline, Plasite 4310 Vinyl Ester Resin with Flake Pigment, 3	P/T	45	N/A	960 per mil	For Tank lining service and as a maintenance coating for severe exposure and abrasive conditions	Excellent abrasion resistance, outstanding chemical and physical properties	3-10 hr recoat 10 day cure	1½ hrs/ 3 months
Carboline, Polibrid 705, Aromatic Polyurethane, 2	P	0	100	1604 per mil	For potable water applications and other aggressive immersion containment applications on steel and concrete	Single-coat, ultra fast cure capabilities, high build and flexible, outstanding abrasion resistance.	2 hr touch 18 hr recoat	5-8 min/ 12-24 months
Carboline, Rustbond & Rustbond FC, Polymeric Epoxy Amine, 2	P/S	85	99	1443 per mil	For marginally prepared steel and over old coatings.	Excellent adhesion, low stress, highly flexible film, low odor, contains corrosion inhibitors, penetrating, solvent resistance.	22 hr touch 12 hr topcoat 6 day cure	50 min/ 36 months
Carboline, Sanitile 755, Ultra-Durable Epoxy Wall Cladding, 2	S	10	100	1604 per mil	For walls, ceilings and equipment requiring protection from aggressive chemicals and cleaning. For steel protection, sealing concrete.	Excellent adhesion and sealing properties, high build capacity, self priming and primer.finish capabilities, excellent abrasion and moisture resistance, low odor epoxy.	24 hr recoat 7 day cure	90 min/ 12-24 months
Carboline, Sanitile 945 High Build Epoxy Coating, 2	T	12	99	1600 per mil	Concrete floors in janitorial closets, service areas, prisons, mechanical rooms, water and wastewater treatment plants, warehouses	Abrasion resistant for pedestrian and fork lift traffic	12 hr tack free 16 hr foot traffic 7 day cure	25-35 min/ 2 yrs
Carboline, Santile 925 Cross-linked Epoxy, 2	T	0	99	52@100 mils	Concrete floors	Good chemical resistance, excellent abrasion resistance	40 hr foot traffic 7 day cure	30 min/ 12 months
ChemMasters, Aquanil, Silicone Moisture Barrier, Penetrating and Clear	P	0	N/A	50 to 125	For exterior stucco, cement plaster, mortar joints, unlazed clay tile, natural and artificial stone, clay brick, concrete brick, facing brick, formed and poured concrete, concrete block, precast concrete.	Invisible moisture barrier, minimizes efflorescence, breathable, resists discoloration.	N/A	/ 1 yr
ChemMasters, Chemisil, WB Clear liquid Sodium Silicate Hardner	S	0	N/A	200-600	For interior or exterior concrete surfaces, horizontal or vertical applications, floor slabs, formed and poured walls, curing agent for surfaces scheduled to receive subsequent treatments.	Seals, hardents and dustproofs in one operation, no odor, compatible with most adhesives, increases resistance to penetration of liquids and oils.	½ to 1 hr touch	Single Component/ 1 yr
ChemMasters, Chemisil Plus, Chemically Reactive Liquid Hardener	S	0	N/A	200	For interior or exterior, horizontal or vertical concrete or masonry surfaces, freshly poured or older, cured concrete, industrial, commercial or warehouse floor slabs.	Chemically reactive liquid hardener for concrete surfaces, increases surface density and durability, dries quickly.	2 to 4 hr touch 6 to 8 hr light foot traffic	Single Component/ 1 yr
ChemMasters, Duraflow 150, Self-Leveling Epoxy, 2	T	0	N/A	100	For interior, horizontal concrete surfaces, industrial, commercial, municipal and warehousing applications, resurfacing spalled, pitted or deteriorated concrete floors.	Excellent wear resistance, excellent impact and abrasion resistance.	12-24 hr cure	N/A/ 1 yr
ChemMasters, Duraflow 250, Self-Leveling Epoxy Novalac, 2	T	0	N/A	115	For interior, horizontal concrete surfaces, industrial, commercial, municipal and warehousing applications.	Excellent wear resistance, excellent impact and abrasion resistance.	12-18 hr tack free	N/A/ 1 yr
ChemMasters, Duraflow 450, Self-Leveling Methyl Methacrylate	T	0	N/A	100-115	Uses include interior or exterior, new or older, horizontal concrete surfaces, industrial, commercial or warehousing applications.	Exceptional resistance to acids and alkalies, Excellent flowability, superior flex, withstands abrasion and impact loading.	1-2 hr cure	20-40 min/ 1 yr
ChemMasters, Duraguard 100, Epoxy, 2	P/S	0	100	200	For interior, horizontal concrete surfaces	Primes surfaces specified to receive epoxy, novalac or urethane coatings, excellent adhesion to dry or damp surfaces.	6 hr recoat	32 min/ 1 yr

ChemMasters, Duraguard 120, Epoxy, 2	T	0	100	80-110	For areas subject to moderate wear, chemical attack	High build, withstands extreme temperatures, color fast, high gloss, resistant to most acids, alkalies, solvents, gasoline and aviation fuels, moderate resistance to chemical spills, fumes or immersion, oils, grease.	8 hr tack free 8-24 hr recoat	30 min/ 1 yr
ChemMasters, Duraguard 220, Epoxy Novalac, 2	T	0	100	100-200	Uses include concrete floors subjected to chemical spills, industrial, commercial, manufacturing, petrochemical operations, chemical storage and warehouse facilities, hospitals.	Chemical resistant, high gloss, superior resistance to hyydrocarbons, animal, mineral and vegetable oils.	8 hr recoat	N/A
ChemMasters, Duraguard 400, Methyl Methacrylate, 2	P	0	100	100	Used on interior or exterior, horizontal or vertical, concrete or wood.	Cures rapidly, superior adhesion, may be applied at low temperatures, exceptional flexability and shear stresses.	1-2 hr recoat	20-40 min/ 1 yr
ChemMasters, Duraguard 401, High Molecular Weight Methacrylate, Solvent Free, 3	S	0	100	100-150	Used to provide long term protection for concrete surfaces against water and chloride penetration.	Low viscosity for deep penetration, wide temperature range, excellent impact abrasion and chemical resistance, withstands full immersion in liquid chemicals and water, low odor.	2 hr cure	40-50 min/ 1 yr
ChemMasters, Duraguard 420, High Build Methyl Methacrylate, 2	T	0	100	100	Used on interior, horizontal concrete surfaces, industrial, commercial and warehousing applications, manufacturing and assembly plants, loading docks.	Rapid curing and recoat, excellent resistance to alcohold, petroleum products and aromatic solvents.	20-90 min cure	10-40 min/ 1 yr
ChemMasters, Duraguard 520/530, High Performance Vinyl Ester, 2	T	0	100	45-100	Used for interior or exterior, horizontal or vertical, concrete or steel surfaces, industrial, commercial and warehousing applications, primary or secondary containment dikes and tanks.	Chemical, abrasion and impact resistant and high durability, excellent flexability & tensile stength, withstands immersion, fumes and spillage of solvents, caustics and organics	4-5 hr tack free 48 hr recoat	45 min/ 3 months
ChemMasters, Safe-Cure & Seal EPX, Clear Epoxy 2	P/S/T	24	31	200	Suitable for use as an epoxy primer or coating for interior/exterior cured concrete.	Excellent resistance to chloride ion penetration, has high level of moisture vapor transmission, improved wear and chemical resistance.	6-8 hr touch 24-72 hr recoat	30 min pot life
Cloverdale Paint, 70329 Ecologic Rustex WB Acrylic Primer	P	99	40	641 per mil	General purpose direct-to-metal primer for properly prepared ferrous and non-ferrous metals at industrial, commercial and/or institutional applications	Good corrosion resistance, re-coat tolerant, adhesion to wide range of substrates	15 min touch 2 hr recoat	Single Component
Cloverdale Paint, 752 Advantage Polymer Epoxy Coating, 2	T	0	100	40-160	Commercial/Industrial flooring applications: hospitals, manufacturing, garage floors, schools, penal institutions, bathrooms and locker rooms, animal shelters	Excellent abrasion and chemicals resistance	9 hr recoat 36 hr cure	25 min gel/ 1 yr
Cloverdale Paint, 83020 PrepTech Epoxy Sealer	S	0	100	1601 per mil	Over aged coatings, concrete, rusty steel, hand or power tool cleaned steel to promote adhesion of subsequent coatings	Enhanced adhesion and durability, excellent weather, solvent, saltwater, abrasion, alkali and oil resistance	8 hr touch 24 hr cure	1 hr/ N/A
Color Wheel Paints & Coatings, 1635 Aquatec Industrial Acrylic Primer	P	87	44	300-500	Structural steel, aluminum, galvanized metals, ferrous metals, copper, stainless steel, fiberglass, polystyrene	Chemical resistant, corrosion resistant, fast drying, early moisture resistant, early rust resistant	30 min touch 2 hr recoat	Single Component
Deft Inc, 09GY007E SB Polyurethane 2	P	0	48	764 per mil	Steel and aluminum	Solvent borne, lead and chromate free, contains exempt solvents, passes lifting, adhesion, flexibility, water resistance and fluid resistance tests	6 hr sand 2 hr topcoat	2 hr/ 1 yr
Deft Inc, 36W021E/ECAT Gloss White, 36BL015E/ECAT Gloss Blue, 36BK001E/ECAT Gloss Black Acrylic Polyurethane, 2	T	0	48	764 per mil	Over primed steel and aluminum	Passes fluid resistance both spot test and immersion test, salt spray resistance, accelerated weathering	15 min recoat	4 hr/ 2 yrs

Dudick, Inc., Polymer Alloy 1000/1000SF, Epoxy 2	T	0	100	150-175	Recommended applications include food processing floors, laboratories, pharmaceutical plants, waste water treatment facilities.	Semi-self leveling, stain and chemical resistant.	24 hr full cure	30-40 min/ 1 yr
Dudick, Inc., Polymer Alloy 2000/2000SF, Epoxy 2	T	0	100	150-175	Recommended applications include food processing floors, laboratories, pharmaceutical plants, waste water treatment facilities.	Semi-self leveling, stain and chemical resistant.	24 hr full cure	30 -40 min/ 1 yr
Dudick, Inc., Protecto-Coat 100 XT, Novolac Epoxy 2	P/T	0	100	38-40@ 40 mils	Recommended applications include secondary containment, structural steel, floors (spillage), storage tanks, pump housings.	Flake filled, high performance, low odor, environmentally safe, chemical resistance	6-8 hr recoat 36 hr cure	30 min/ 1 yr
Dupont, Corlar LV Semi-gloss Epoxy Mastic 2	P/I/T	85	90	288@5 mils	carbon steel, galvanized steel, stainless steel, aluminum, concrete, concrete block, wood	Should be topcoated for exterior exposure, chemical resistant, corrosion resistant	4 hr touch 8 hr recoat 24 hr cure	90 min/ 1+ yrs
Dupont, Imron 230-ZV High-gloss WB Polyurethane 2	T	0	77	617@2 mils	General metal finish for harsh chemical environments	Chemical and abrasion resistant, flexible	3-4 hr touch 6-8 hr recoat 8 day full cure	N/A/ 9 month +
Duromar, 1110 High Performance Lining, Epoxy, with a modified alkyl-amine 2	P/T	0	100	40@40 mils	Oil and other storage tanks	Good chemical resistance to dilute and mild inorganic acids as well as water, seawater and de-mineralized water, flexible, high gloss	6 hr tack free 6-120 hr overcoat	90 min/ 12 months
Duromar, 1301 High Performance Lining, Epoxy with a modified aliphatic/cycloaliphatic amine hardener 2	S/T	0	100	160-200	Moisture tolerant concrete sealer used to restore the integrity of old concrete and prevent outgassing prior to application of the topcoat, can also be used as a clear topcoat	Moderate chemical and abrasion resistance	8 hr tack free 8-72 hr recoat	60 min/ 12 months
Duromar, 4300 Series High Performance Lining, Epoxy with modified cycloaliphatic amine hardener	P	0	100	40@40 mils	Boiler skirts, incinerator outlets, power plant outlet ducts, utility FGD systems, prtrochemical and acid storage tanks	Outstanding chemical resistance, used in areas requiring temperature and abrasion resistance	3-8 hr tack free 2½-72 hr recoat	20-45 min/ 12 months
Duromar, 1510 High Performance Lining, Epoxy with a modified amido-amine hardener 2	P	0	100	320@5 mils	A low viscosity holding primer for steel surfaces allowing for extremely long overcoat windows	Moderate abrasion and corrosion resistance,	6-8 hr tack free 6-120 hr recoat	45 min/ 12 months
Duromar, 2131, 2132, 2134 High Performance Lining, Epoxy with a modified polyamide hardener 2	P	0	100	40@40 mils	Tank linings, for circulating water systems, repair of old tanks	Outstanding abrasion resistance, chemical resistant, unparalleled resistance to mechanical damage, high build upto 250 mils	6-8 hr tack free 6-120 hr recoat	35 min/ 12 months
Duromar, 2201 High Performance Lining, Epoxy with modified aliphatic/cycloaliphatic amine hardener, 2	P	0	100	40@40 mils	Process vessels, baghouse or precipitator walls, coal bunkers, flooring	Fast curing, outstanding abrasion and chemical resistance	3 hr tack free 3-24 hr recoat	20 min/ 12 months
Duromar, 2221 High Performance Lining, Epoxy with modified aliphatic/cycloaliphatic amine hardener, 2	P	0	100	40@40 mils	Rail cars, ash hoppers, slurry tanks, secondary containment, traveling water screens	Flexible, abrasion and chemical resistance	3 hr tack free 3-24 hr recoat	45 min/ 12 months

Duromar, 2310, 2510, 2510-UW High Performance Lining, Epoxy with a modified amido-amine hardener 2	P	0	100	40@40 mils	Tank linings, floors and secondary containment, 2510-UW for under water or extremely damp applications such as dams, sewage treatment systems, process water tanks	Excellent chemical resistance and ease of workability	8-12 hr tack free 6-120 hr recoat	40-60 min/ 12 months
Duromar, 3320 High Performance Lining, Bis-phenol F Epoxy with modified cycloaliphatic amine hardener, 2	P	0	100	40@40 mils	Flooring and secondary containment	Outstanding chemical resistance to surlfuric and other inorganic acids, good abrasion resistance, excellent adhesion	6-48 hr recoat 42 hr cure	45 min/ 12 months
Duromar, 6310 High Performance Lining, Epoxy with modified aliphatic/cycloaliphatic amine hardener, 2	T	0	100	160-200	Clear topcoat that can be used on all properly prepared substrates for UV protection	Outstanding color stability and UV resistance, moderate chemical and abrasion resistance	5 hr tack free 4-72 hr recoat	40 min/ 12 months
Duromar, HydroFlor DuroFlor Lining, 2	P/T	0	100	50@30 mils	Concrete floors	Breathable, excellent adhesion to smooth, damp, poorly prepared concrete, outstanding resistance to mechanical abuse	6 hr tack free 6-96 hr recoat 7 day cure	45 min/ 12 months
Enviroline, 376F-30 Tank and Pipelining Hybrid Epoxy, 2	P/T	0	100	80@20 mils	Petroleum Industry such as bulk storage tank linings, floors, tank pads, trenches, interior/exterior pipes, troughs, sumps	Excellent adhesion, superior abrasion resistance, impact resistance, cathodic disbondment resistance, resists chemicals and solvents, high temp stability, fast cure	2 hr touch 2½-4 hr recoat 11 hr cure	30 min/ 2 yrs
Enviroline, 393-PM Low Temp Cure Epoxy Topcoat, 2	T	0	100	80@20 mils	Steel storage tank interiors, floors and secondary containment areas in low temperature application	Excellent gloss retention, flexible, excellent adhesion, corrosion, abrasion and stain resistance, fast curing	15 min touch 1 hr handle 4-20 hr recoat	15 min/ 2 yrs
Enviroline, 399-30 Tank and Pipelining Hybrid Epoxy, 2	P/T	0	100	80@20 mils	Petroleum Industry such as bulk storage tank linings, floors, tank pads, trenches, interior/exterior pipes, troughs, sumps	Excellent adhesion, superior abrasion resistance, impact resistance, cathodic disbondment resistance, resists chemicals and solvents, high temp stability, fast cure	2 hr touch 2½-4 hr recoat 11 hr cure	30 min/ 2 yrs
Enviroline, 125LV Epoxy Lining	P/T	48	96	77@20 mils	Internal lining for steel and concrete storage tanks, secondary containment and exterior buried pipe	Gasoline and gasohol resistance, excellent adhesion, impact and abrasion resistance	2-4 hr touch 3 hr recoat 24 hr cure	41 min/ 2 yrs
Enviroline, 125U Third-Party Certified UST Lining, 2	P/T	13	100	16@100 mils	Internal lining for steel, fiberglass and concrete underground storage tanks, secondary containment	Gasoline and gasohol resistance, excellent adhesion, 100% methanol and ethanol resistance, fast cure	2-4 hr touch 3 hr recoat 10-12 hr cure	10 min/ 2 yrs
Enviroline, 150 Solvent Resistant Novolac Epoxy Lining, 2	P/T	0	100	40@40 mils	Steel and concrete storage tanks, floors, and containment vessels containing acid, alkali, solvents, and corrosive salts	Resists aggressive solvents, excellent adhesion, abrasion and impact resistance, fast cure	2 hr touch 2-4 hr recoat 8 hr cure	5 min/ 2 yrs
Enviroline, 222 Moisture Tolerant Epoxy Novalac Lining, 2	P/T	0	100	80@20 mils	Sewer manholes, concrete sewage pipes, lift stations, wet wells, concrete pipes, other subgrade structures	Superior chemical resistance, excellent adhesion to concrete, abrasion and impact resistance, fast cure	1 hr touch 2 hr recoat 8 hr cure	15 min/ 2 yrs
Enviroline, 224 Wastewater Epoxy Novalac Lining 2	P/T	0	100	80@20 mils	Waster water treatment application	Superior chemical resistance, excellent adhesion to concrete, abrasion and impact resistance, fast cure	50 min touch 1½-4 hr recoat 10 hr cure	20 min/ 2 yrs
Enviroline, 225 Acid Resistant Hybrid Novolac Epoxy lining, 2	P/T	0	100	40@40 mils	Steel and concrete storage tanks, floors and containment areas containing acids, alkalies, solvents, and corrosive salts	Acid resistant, excellent adhesion, thermal & mechanical shock resistance, fast cure	45 min touch 45 min recoat 6-8 hr cure	11 min/ 2 yrs

Enviroline, 230 Potable Water Epoxy Novolac Lining, 2	P/T	16	100	80@20 mils	Internal lining for steel and concrete potable water storage tanks and pipes	Excellent adhesion, commercial hot water resistance	2½ hr touch 3½ hr recoat 16 hr cure	51 min/ 2 yrs
Enviroline, 232 High Performance Epoxy-Based Polymer Lining, 2	P/T	0	100	40@40 mils	Acid, alkali containing steel storage tanks, cooling tower basins, food storage, concrete	Superior chemical resistance, excellent adhesion, abrasion and impact resistance, fast cure, thermal and mechanical shock resistance	40 min touch 2-4 hr recoat 6-8 hr cure	7 min/ 2 yrs
Enviroline, 250 Epoxy Coating, 2	P/T	0	100	40@40 mils	Steel and concrete storage tanks, and vessels, cooling tower basins, concrete sumps, wastewater treatment basins	Excellent Adhesion, abrasion and impact resistance, flexible	4-6 hr touch 8-12 hr recoat 12 hr cure	13 min/ 2 yrs
Enviroline, 290 Organic Acid Epoxy phenolic Lining, 2	P/T	34	100	53@30 mils	Steel Storage tanks containing acids, alkalies and corrosive salts, food and beverage thanks, immersion application	Chemical resistance, excellent adhesion, abrasion and impact resistance, high temperature stability, fast cur, thermal and mechanical shock resistance	40-45 min touch 40 min recoat 7-8 hr cure	18 min/ 2 yrs
Enviroline, 333 Aquatic Environment Lining Thick Epoxy-Based Polymer, 2	P/T	30	100	80@20 mils	Aquatic environments such as swimming pools, fountains, aquatic theme parks	Designed for continual immersion, moisture tolerant, excellent adhesion to concrete, fast curing, safe from chemical attack	3 hr touch 4½ hr recoat	25 min/ 2 yrs
Enviroline, 361 Low Temp Cure Epoxy Coatings, 2	P/T	80	90	72@20 mils	Corrosion protection of exterior steel such as storage tank bottoms and pipes	Excellent gloss retention, flexible, excellent adhesion, corrosion, abrasion and stain resistance, fast curing	4 hr touch 20-24 hr recoat 48-74 hr cure	1 hr/ 2 yrs
Enviroline, 371 DTM Epoxy Coating, 2	P/T	21	100	133@12 mils	Structural steel or concrete including storage vessels containing food	Excellent adhesion, impact and abrasion resistance, wide range chemical resistance thermal and mechanical shock resistance	2 hr touch 2 hr recoat	26 min/ 2 yrs
Enviroline, 399ABR Abrasion Resistant Epoxy Coating, 2	P/T	0	100	80@20 mils	Potash mines, exterior pipelines, slurry tanks	Superior abrasion resistance, excellent flexibility, corrosion , adhesion resistance, fast cure, high temp resistance	2 hr touch 2½-4 hr recoat 11 hr cure	30 min/ 2 yrs
Enviroline, 53 Gray Concrete Epoxy Polyamide Primer, 2	P	28	95	508	Continuous or intermittent immersion exposure for concrete or masonry	Fast curing, excellent adhesion to cementitious surfaces	2 hr touch 3-12 hr recoat 24 hr cure	1½-2 hrs/ 2 yrs
EPMAR, SS1211 Sta-Crete Solids Coal Tar Epoxy, 2	P	0	100	N/A	Concrete, steel surfaces associated with water/wastewater treatment, weir structures, piping digesters, abrasion service, acid/alkali containment, petrochemical refining, waterproofing cement and cinder block wall	Water/chemical resistant, excellent adhesion, can be applied in immersion service, cures to an abrasion resistant hydrophobic film	4-24 hr recoat 5 day cure	30 min/ N/A
EPMAR, Sta-crete #47 Industrial Metal Primer WB Acrylic	P	58	40	250-300	Steel storage tank exteriors, steel bridges, piping and pump equipment, rebar, OEM metal applications, marine steel decks	corrosion resistance, fast dry, highly adhesive, moisture tolerant, single component	2 hr topcoat 48 hr cure	Single Component
Euclid Chemical Company (RPM), Euco #512 Vox Epoxy Sealer, 2	T	58	20	250-600	Concrete parking decks, bridge decks, industrial floors	Penetrant, Improves wear and chemical resistance, reduces water and salt absorption	12-24 hr foot traffic 48 hr cure	4 hr/ 1 yr
Euclid Chemical Company (RPM), Eucopoxy Tufcoat HB+, 2	T	0	100	100-125	Warehouse floors, auto repair, chemical plants, showrooms, terminals, fabrication facilities, manufacturing plants	Wear resistant, excellent resistance to a variety of chemicals, semi-gloss finish	5-8 hr touch 48 hr cure	30-40 min/ 2 yr
Euronavy, Euro-Basic ES301, Modified Epoxy/Amine 2	P/I/T	0	100	225-325	Recommended uses include pipe coatings, ships, offshore & marine structures, structural steel & equipment.	Moisture tolerant solvent free primer, no harmful solvent vapors, superior impact resistance, non-flammable, good chemical resistance, excellent adhesion.	16 hr touch 16 hr recoat 7 day cure	45 min/ 1 yr

Euronavy, Euro-Basic ES301FT, Modified Epoxy/Amine 2	P	0	100	250	For highly corroded horizontal surfaces. Recommended uses include pipe coatings, structural steel & equipment, ships, offshore & marine structures.	Surface tolerant, without dew-point restrictions. Moisture tolerant solvent free primer, no harmful solvent vapors, superior impact resistance, non-flammable, good chemical resistance, excellent adhesion.	4 hr touch 12 hr recoat	15 min/ 1 yr
Euronavy, Euro-Basic ES301S, Modified Epoxy/Amine 2	I	0	100	273	Recommended uses include structural steel & equipment, ships, offshore & marine structures.	Intermediate solvent free epoxy with high edge retention ability. No harmful solvent vapors, no VOC's.	6 hr touch 16 hr recoat	45 min/ 1 yr
Euronavy, Euro-Floor ES302H, Epoxy 2	T	0	100	17.3 per pound	For concrete surfaces such as sea walls, pools, aquariums, cams, floor, aqueducts, tanks, tunnels	High abrasion resistance. No harmful vapors, no VOC's, superior impact resistance, non-flammable, good chemical resistance, fast drying.	7 hr touch 16 hr recoat	40 min/ 1 yr
Euronavy, Euro-Joker BE09, Modified Epoxy/Amine 2	T	0	100	1.34 per pound	for steel, aluminium and concrete surfaces, including repair of steel & concrete bottom tanks. For industrial floors, ships, and offshore structures.	Excellent mechanical resistance. Flexible epoxy self levelling, no harmful solvent vapors, no VOC's, superior elasticity, non-flammable, good chemical, solvent and water immersion resistance.	5 hr touch 16 hr recoat	20 min/ 1 yr
Euronavy, Euro-Steel BE23, Modified Epoxy/Amine 2	P	0	100	273	Recommended uses include floors on steel or concrete such as industrial, anti-skid, food industry, warehouses, decks. Also appliable as concrete primer.	Solvent free epoxy resin, no harmful solvent vapors, no VOC's, superior impact resistance.	4 hr touch 16 hr recoat	12 min/ 1 yr
Euronavy, Euro-Wet BE14	P	0	100	22.4	Recommended uses include pipe coatings, ships, offshore, concrete pylons.	Solvent free, tolerant to humid surfaces. Certified for potable water contact. No VOC's, non-flammable, good chemical resistance.	3 hr touch 16 hr recoat	10 min/ 1 yr
Everest Coatings, Evercoat 900 Spray Polyurea Coating	P/I	0	100	100	For containment, encapsulation and most substrates	Flexible, durable, excellent adhesion, thermal stability, prevents penetration of water	5 sec tack free 30 sec walk	N/A
Florock Seamless Systems, System 4700 High Speed Epoxy 2	I/T	0	100	100	Floor resurfacer, ideal for use over existing coatings that are well-bonded and properly prepared.	Cures quickly for durability, contains no solvents and is low odor, chemical resistant	1½-2 hr touch 3-4 hr recoat	4 gallon volume/ 21 min
FMi Paint and Stain Corp. 402 Series Galvabond 100% Acrylic Industrial Coating	P/T	52	35	200	Mildly rusted building surfaces, chemical storage tanks, transmission and microwave towers, industrial steel decking, aluminum, gar joists, galvanized and metal roofs, silos, metal buildings, concrete and masonry walls	Excellent gloss retention and chalk resistance, adhesion to difficult repair surfaces, wide variety of chemical resistance, non-yellowing, quick dry, rust inhibition	1 hr touch 12 hr recoat	Single Component
Freecom Inc, CeRam-Floor Primer 2	P	0	100	800@2 mils	Seal coat for concrete	An epoxy resin designed to penetrate and provide a seal coat to unsealed concrete.	18 hr cure	N/A 1 yr
Freecom Inc, CeRam-Floor Self-Leveling Ceramic Slurry, 3	I/T	0	100	40@40 mils	Concrete floors in packaging and storage areas, locker and restrooms, clean rooms, animal care, forklift areas, loading docks	High build, protective resurfacing system, self-leveling and seamless, durable, stain resistant	10-12 hr cure	N/A 1 yr
Freecom Inc, CeRam-Floor Trowelable Resurfacing Material, 3	I/T	0	100	13@125 mils	Resurfacing old concrete floors, heavy impact areas, leading docks, forklift areas	tough and impact resistant resurfacing, durable, wear resistant	12-24 hr cure	N/A 1 yr
Freecom Inc, Ceram-Kote 2000, Ceramic Novalac Epoxy, 2	T	89	83	N/A	All metals, fiberglass reinforced plastics, concrete for environments such as internal tanks, harsh chemicals, clarifiers, fuel tanks, petrochemical facilities, wastewater treatment	Non-UV areas, excellent chemical immersion service, highly cross-linked, may be force cured by heat	5 hr touch 24 hr cure	1 hr/ 2 yrs
Freecom Inc, Ceram-Kote SPG22, Ceramic Novalac Epoxy 2	I/T	0	100	53@30 mils	Tanks and processing vessels, pipeline protection, dredge Equipment, pump impellers, cooling towers, secondary containment, ship decks, tile sealer, concrete walls and floors	High-build corrosion barrier, non-shrinking surface after application	1-3 hr touch 24 hr cure	N/A 2 yrs

Gaco Western Inc, GacoFlex E-5320 WB Epoxy, 2	P	99	44	70-250	Metals, organic polymers, wood, masonry, vitreous surfaces, approved for meat and poultry processing buildings	Good solvent, fair acid, excellent alkali resistance, hard coating, solvent and vapor resistant, excellent adhesion	2-3 hr overcoat 7 day cure	1½ hr/ 1 year
Gaco Western Inc, GacoFlex E-5481 Epoxy	P	0	100	100-200	For concrete surtaces, adheres well to most metals, organic polymers, wood, masonry and vitreous surfaces	Good solvent, fair acid, excellent alkali resistance, solvent and vapor resistant, excellent adhesion, hard coating	2-3 hr overcoat 7 day cure	1½ hr/ 1 yr
Gaco Western Inc, GacoFlex LM-60 Liquid-Applied Urethane, 2	T	0	100	1600 per mil	High-build waterproofing membrane over concrete, metal, plywood. To line potable water storage tanks and water treatment facilities	Excellent durability to 180º F, excellent resistance to water immersion, good salt and alkali resistance, fair acid and solvent resistance, excellent hydrolytic stability	1 hr touch	1 hr/ 1 yr
Gaco Western Inc, GacoFlex RU-92, Polyurea Spray Elastomer System, 2	T	0	100	1600 per mil	Lining steel, masonry or wood tanks, silos, pipes, flumes,	Provides tough, abrasion, chemical and corrosion reistance, self-priming on most surfaces	20 sec handle 12 hr cure	2-3 sec gel/ 1-2 yr
Gaco Western Inc, GacoFlex U-62 Urethane, 2	I/T	0	100	1600 per mil	High-build base and finish for mechanical room floors, walking decks and vehicular traffic decks on floors of plywood, concrete and metal	Good hydrolytic stability, good resistance to inorganic bases, acids and hydrocarbon solvents, fair resistance to oxygenated and chlorinated solvents, weather and wear resistant, tough	8 hr set 18-24 hr foot traffic +24 hr vehicle traffic	20-25 min/ 1 yr
Gaco Western Inc, GacoSil S-13 Water-Based Clear Elastomeric Silicone	T	0	18	287 per mil	Protective coating and membrane for exterior applications are areas where solvent based coatings are not desirable or could be hazardous	Excellent weatherability, adheres well to most surfaces, non-toxic	Complete evaporation of water to cure	Single Component/ 1 yr
Global Eco Technologies Inc, 1988 Endura-Flex Elastomeric Polyurethane	P/T	0	100	1604 per mil	Use in gaseous or liquid phase exposures found in water and watewater vessels both steel and concrete	Superior hydrolytic stability, seamless monolithic film, self-priming	20 min touch 1 hr foot traffic 120 hr cure	<3 min/ 1 yr
Global Eco Technologies Inc, 1990 Endura-Flex Elastomeric Polyurethane, 2	T	0	100	1604 per mil	Concrete, asphalt, steel, wood and earthen substrates for secondary containment, petroleum and wate treatment	Exceptional chemical inertness, elongation and UV resistance	30-40 min touch 2 hr foot traffic 168 hr cure	<1 min/ 1 yr
Global Eco Technologies Inc, Endura-Flex RBU Polyurethane	P/T	0	100	1604 per mil	Long term protection of buried/immersed interior/exterior steel or concrete pipe	Corrosion barrier for wastewater or salt water, chemical resistance	15 sec touch < 5 min handle 10 min to bury	<15 sec/ 1 yr
Global EcoTechnologies Inc, 1200 P Endura-Flex Epoxy Primer Sealer, 2	P/T	0	100	1604 per mil	Steel and porous substrates exposed to the chemical and physical enfironments in water and wastewater treatment	Fast overcoat times, good penetration and wetting	Recoat wet or tacky to touch 72 hr cure	40-50 min/ 1 yr
Global EcoTechnologies Inc, 550 Endura-Flex Primer/Sealer, Pre-Reacted Polyurethane Emulsion	E	0	45	540 per mil	Porous substrates such as concrete, asphalt, and wood for secondary containment in intermittant immersion, splash and spill situations	For exposure to chemical and physical environments found in water and water treatment industries	30 min touch	Single component/ 1 yr
ICI Paints (Devoe), 305 Catha-Coat WB Inorganic Zinc Coating	P/T	0	61	978 per mil	Steel structures, tanks, equipments, piping in refineries, chemical process plants, chemical storage tanks and pulp and paper mills	Resistance to solvents, good color contrast, resists mudcracking	2 hr self recoat 4 hr handle 24 recoat 7 day for immersion	5 hrs/ >12 months
ICI Paints (Devoe), 525 DEVFLOOR Epoxy Resurfacer 2	P/I	10	100	107-321	Concrete floors	Good chemical and abrasion resistance, low odor	10-24 hr recoat 72 hr cure	20 min/ 2 yrs
ICI Paints (Devoe), 569 DEVFLOOR WB Urethane 2	T	20	48	320-400	Concrete floors	Durable film against moderate chemical spills, high light reflectance, high abrasion resistance, excellent anti-soiling properties	6-24 hr recoat 72 hr cure	30-40 min/ 1 yr
Insl-X Superior Coating Systems, EP-5200 100% Solids Epoxy Coating, 2	X	0	100	1604 per mil	Concrete floors exposed to heavy traffic, or severe chemicals	Abrasions and chemical resistant, high gloss finish, pot life 45 minutes	6 hr touch 5 day cure	45 min/ 1 yr

International Protective Coatings, Intergard 270 Waterborne Epoxy 2	X	47	50	267	Non-immersed steel surfaces at petrochemical plants, pulp and paper mills, power stations, bridges and offshore sturctures	Anti-corrosive pigmented with zinc phosphate, fast drying	30 min touch 1 hr hard dry 3 hr recoat	3 hr/ N/A
ITW Devcon Futura Coatings, Protec II, Fast Set Urethane, 2	P/T	0	100	1604 per mil	For steel and ductile iron pipelines, sheet piling and many other metal substrates.	Excellent adhesion, fast curing, durable, long-term chemical resistance and corrosion protection.	3-4 min touch 4-10 min recoat 72 hr full cure	<15 sec/ 1 yr
ITW Resin Technologies, IMPAX 350 Rapid-Cure Epoxy Anti Slip	I	90	90	30-60	Deck coating in slippery areas in marine and industrial environments on concret, steel, wood and previously painted surfaces	Self-sealing, anti-slip, optimal toughness and corrosion resistance, fire retardant, resistant to acids, alkalies, solvents, grease, oil, saltwater, alcohol, gasoline, jet fuels, hydraulic fluids	12-72 hr traffic	45 min/ N/A
ITW Resin Technologies, IMPAX 700 High Solids W/B Epoxy, 2	I	25	96	200	Moderate to high traffic conditions and moderate chemical exposure on concrete, wood and previously painted surrfaces	High build, self priming, full gloss finish	8 hr recoat 72 hr foot traffic 5 day cure	40 min/ 1 yr
ITW Resin Technologies, IMPAX HPU 100 Urethane, 2	I	0	100	150-250	Aircraft hangars and other difficult environments on concrete, steel, wood and previously painted surfaces	High-build, high gloss, abrasion resistant, excellent color stability and chalking resistance, high chemical resistance	16 hr recoat 24 hr foot traffic 7 day cure	45 min/ 1 yr
JFB Hart Coatings, HP-105, Aliphatic Polyurethane, Clear/Pigmented High Gloss, 2	T	0-10	53-63	250-650	Steel, Aluminum, galvanized metals, previously painted surfaces for exterior tanks, structural steel, chemical plants, refineries, floor coating systems	For both Interior/Exterior, excellent stain, chemical and abrasion resistance, UV resistant, great adhesion, non-yellowing, emits no isocyanates	4 hr touch 6-8 hr recoat 7 day cure	2 hr/ N/A
JFB Hart Coatings, HP-330 High Solids Epoxy, High Gloss 2	I/T	0	90	100-150	Floor applications over concrete for interior application, can be used as an exterior primer with topcoat, Steel, aluminum, galvanized metal, previously painted surfaces	Excellent acid, chemical, stain and abrasion resistance	12 hr recoat	45 min/ N/A
KCC Coatings, AEP 18 AR TECHNI-PLUS, 2	P/T	0	100	107	For use as an erosion and abrasion coating immersion system on steel or other metallic surfaces.	Amine adduct cured flexibilized epoxy abrasion and erosion resistant coating/lining system, chemical resistant, high bond, used on interior or exterior.	4 hr recoat	45 min/ 1 yr
KCC Coatings, AEP 20 TECHNI-PLUS, 2	P/T	0	100	80	For use as an immersion lining system, a light to moderate traffic flooring system & corrosion resistant coating on concrete or steel.	Amine adduct cured epoxy coating/lining system, chemical resistant, corrosion resistant, resistant to waterspotting, resists blush	10 hr recoat	1 hr/ 1 yr
KCC Coatings, AEP 25.3 AR TECHNI-PLUS, 2	P/T	0	100	64	May be applied directly to damp concrete surfaces, also used on steel, may be used in flooring protection. Superior choice for trenches, sumps, containment dikes, tank linings, vaults, pipe tunnels, and process area surfaces.	Epoxy novolac coating/lining system, superior chemical resistance, excellent abrasion and impact resistance and outstanding bond strength.	6 hr recoat	30 min/ 1 yr
KCC Coatings, EN 25.6 TECHNI-PLUS, 2	P/T	0	100	64	For use in railcars, tank trucks as well as process vessels or any steel or aluminum substrate subject to bending stresses and movement.	100% solids, ductile, epoxy novolac coating/lining system, superior inorganic acid resistance, chemical, abrasion & impact resistance, outstanding bond strength.	6 hr recoat	30 min/ 1 yr
KCC Coatings, 3100 CL Thermocoat	T	0	100		Industrial atmospheric maintenance coating for steel and concrete surfaces as well as over old coatings.	High performance thermoplastic system, tough and flexible, corrosion & abrasion resistant with exceptional molecular permation resistance along with UV and weathering resistance.	Ready for service in minutes	Single Component
Key Resin Company, 420 Key Polyurethane Coating, 2	T	25	100	160	Floor coating designed to provide high gloss, UV stable, chemical resistant protection, clear or pigmented. Low odor for use in occupied areas,	chemical & stain resistant, easy application, UV stable.	4-5 hr touch 12-24 hr recoat 7 day full cure	30-45 min/ N/A

Key Resin Company, 440 Key Aliphatic Urethane Sealer, 1	S	27	27	300	For sealing concrete and stained concrete surfaces.	Easy application with excellent handling characteristics, excellent abrasion & chemical resistance, low odor for use in occupied areas, low maintenance finish, excellent clarity & color retention.	4-5 hr touch 5-24 hr recoat 5 day full cure	8 hr pot/ N/A
Key Resin Company, 502 Key Primer, Epoxy 2	P	0	100	250-275	Moisture tolerant for concrete, wood, and masonry surfaces.	Stress relieving, moisture insensitive cure, low viscosity-good wetting properties.	10-12 hr recoat 5 day full cure	30-40 min/ N/A
Key Resin Company, 520 100% Solids Epoxy Coating, 2	I	0	100	160	Pigmented floor coating designed to provide high gloss, chemical resistant protection. Should be used wherever a high build, corrosive resistant, protective floor coating is required.	Low odor for use in occupied areas, chemical & stain resistant, easy application, provides a smooth, high gloss finish.	10-12 hr touch 12-16 hr recoat 5 day full cure	30-35 min/ N/A
Key Resin Company, 532 Water Emulsion Epoxy Primer, 2	P/S	<60	38-40	250-275	Designed to have maximum penetration into concrete surfaces to provide high bond strength and adhesion. Specially formulated to reduce concrete outgassing.	Low odor during application and cure, easy cleanup, can be used on damp/green concrete.	4-6 hr touch 6-24 hr	>3 hr pot/ N/A
Key Resin Company, 535 Water Emulsion Epoxy Finish, 2	T	<60	40-45	275-300	Pigmented, self priming water emulsion epoxy finish designed to have maximum penetration into concrete surfaces to provide high bond strength and adhesion. Specially formulated to reduce concrete outgassing.	Low odor during application and cure, easy cleanup, can be used on damp/green concrete.	4-6 hr touch 6-24 hr recoat 7 day cure	2-4 hr/ N/A
Key Resin Company, 544 Key Epoxy Wall Coating	P/T	0	100	160	For wall and containment applications.	Low odor application and cure, chemical & stain resistance, bonds well to cool, damp substrates.	8-10 hr touch 8-12 hr recoat 5 day full cure	40-50 min/ N/A
Key Resin Company, 625 Key Epoxy Novolac Coating, 2	T	0	100	100	Floor coating available in multiple colors.	Superior chemical & stain resistance, easy application, bonds well to cool, damp substrates, low odor for use in occupied areas, suitable for immersion and wet process flooring applications.	6-8 hr touch 12-16 hr recoat 5 day full cure	20-25 min/ N/A
Key Resin Company, 633 Key Novolac Epoxy Coating, 2	S	0	100	160	Excellent for secondary containment, solvent storage, pump pads, trenches, and other high exposure areas.	Excellent resistance to strong acids, alkalis, and most industrial chemicals and solvents, bonds well to cool, damp substrates.	4-6 hr touch 10-12 hr recoat 5 day full cure	20 min/
Key Resin Company, 644 Key Chemical Resistant Epoxy Wall Coating, 2	T	0	100	160	For wall and containment applications, should be used in areas requiring a high build, acid and alkali resistant, protective coating.	Low odor application and cure, suitable for immersion and wet process, superior stain and chemical resistance, bonds well to cool, damp substrates.	8-10 hr touch 8-12 hr recoat 5 day full cure	40-50 min/
Kryton Epox-9, K450, Epoxy Coating, 2	T	0	100	400	Recommended uses include swimming pools, decorative ponds and fountains, water reservoirs and secondary containment, school hallways and washrooms, industrial floors and walls, commercial and retain applications, public transportation.	Features glossy finish, water impervious, stain & chemical resistant, resistant to chlorine and bromine, graffiti resistant, easily cleaned, superior abrasion resistant, wide variety of colors available.	12-36 hr recoat 5 day cure	35 min/ 1 yr
Manufacturing & Consulting Chemists Inc, 467 Series WB Acrylic Industrial Coatings	T	100	30-33	N/A	Steel, aluminum, galvanized surfaces, plastic and glass	Excellent abrasion and chemical resistance	30 min touch 1 hr recoat	Single Component
Monopole Inc, 1100, 1150 Monochem 1, 2	P/S	0	N/A	250-300	Used in the Monochem Decking System, wood, metal, excellent sealer for concrete floors in warehouses and factories	100% Epoxy	30 min touch 3 hr recoat	3 hrs/ 1 year
Monopole Inc, 5350, 5355 Monochem Permashield 200, 2	T	<70	N/A	200	Interior/exterior for concrete, masonry, wood, aluminum and metal in office buildings, pharmaceutical, medical and food facilities	Exhibits outstanding film hardness, excellent direct impact/reverse resistance, abrasion, chemical and UV resistance	6-8 hr touch 24-36 hr recoat 5 day cure	1-2 hrs/ N/A

Novocoat Protective Coatings, (Superior Environmental Products, Inc.) ER-1500 NovoFlex, Epoxy Amine, 2	S/T	0	100	160	For metal and concrete substrates. Can be applied to asphalt secondary containment structures. For cooling Towers, floors, walls, foundations, vaults, bunkers.	A versatile, elastomeric coating with a high level of chemical resistance, outstanding adhesion	24 hr recoat 7 day full cure	40-45 min/ N/A
Novocoat Protective Coatings, (Superior Environmental Products, Inc.) ER-2000 NovoFlex, Epoxy Amine, 2	S/T	0	100	160	For metal and concrete substrates including both asphalt and concrete secondary containment structures.	Elastomeric coating, crack-bridging, respectable chemical resistance, good UV stability, outstanding adhesion.	24 hr recoat 7 day full cure	1 hr/ N/A
Novocoat Protective Coatings, (Superior Environmental Products, Inc.) SC-1100 NovoFloor, NovoPipe, NovoPro, NovoPure, NovoSeal, NovoShield Epoxy 2	P/S	0	100	300-500	For concrete, steel, cast iron used for floors and pipes at potable water, power generation, and waste water facilities and also for secondary containment structures.	Excellent chemical and heat resistance, no solvents, no VOC's, bond both mechanically and chemically to substrate, excellent wear resistance, do not create hazardous waste.	5-12 hrs recoat 7 day full cure	4 hrs, 10 min/ N/A
Novocoat Protective Coatings, (Superior Environmental Products, Inc.) SC-2100 NovoFloor, NovoShield Ceramic Novolac Epoxy, 2	T	0	100	160	Floor coatings for any shop, garage, or warehouse when chemical and wear resistance are less severe.	No solvents, no VOC's, bond both mechanically and chemically to substrate, do not create hazardous waste.	1-5 hr recoat 7 day full cure	45 min
Novocoat Protective Coatings, (Superior Environmental Products, Inc.) SC-3100 NovoFloor, NovoShield Ceramic Novolac Epoxy, 2	T	0	100	160	High performance floor coatings such as aircraft hangers and first class protection for secondary containment.	Designed for strong acids, chemical and high wear resistance	2 hr recoat 7 day full cure	42 min/ N/A
Novocoat Protective Coatings, (Superior Environmental Products, Inc.) SC-3300 NovoPipe, NovoPro Epoxy 2	P	0	100	160	Maximum protection for steel, cast & concrete pipe, professional coatings for the petro-chemical & refining industries.	For high temperature, tough chemical and immersion service.	1-1½ hr recoat 7 day full cure	30 min/ N/A
Novocoat Protective Coatings, (Superior Environmental Products, Inc.) SC-4600 NovoPipe Cycloaliphatic Epoxy, 2	P/T	27	98	157	Maximum protection for steel, cast & concrete pipe.	Heat-cured exterior pipe coating with superior weather resistance including UV, excellent flexibility, designed for thermal cycling, good abrasion and impact resistance, outstanding chemical resistance.	9 min-1 hr touch 5 min-45 min recoat	4 hr/ N/A
Novocoat Protective Coatings, (Superior Environmental Products, Inc.) SP-2000, SP-2000R, SP-2000W NovoFloor, NovoPipe, NovoPure, NovoSeal, NovoShield, NovoTower Novolac Epoxy, 2	P/T	0	100	160	High performance floor coatings, maximum protection for steel, protective coating for the waste water industry, secondary containment, cooling towers, cast and concrete pipe.	Excellent chemical and heat resistance, no solvents, no VOC's, bond both mechanically and chemically to substrate, excellent wear resistance, do not create hazardous waste, excellent adhesion.	24 hr recoat 7 day full cure	2 hrs, 30 min
Pacific Polymers, Elasto-Deck 6500 PT/VT, 2	T	0	100	80	Concrete or plywood walking decks, balconies plazas, parking decks, mechanical room floors	Elastomeric, waterproof	2-3 hr tack free 72 hr cure	20 min/ N/A
Pacific Polymers, Elasto-Poxy Primer W.B., 2	P	0	100	250-350	Primer for polyurethane deck coating systems	Fast drying, low odor, non-flammable	1 hr touch	1-2 hr/ N/A
Pacific Polymers, Res-Crete R.C.700 Epoxy 2	T	40	98	150	Warehouse floors, decorative show rooms, chemical processing plants, metal finishing plants, steel mills, food processing plants, sewage and wate treatment plants, aircraft hangers and industrial plant floors	Tough, abrasion resistant, light reflective, good chemical resistance	6-7 hr tack free 8-10 hr light traffic 48 hr cure	25 min/ N/A
Polibrid Coatings, Polibrid 670-S, Epoxy, 2	P	3	99	1599 per mil	Concrete surfaces at pump stations, manholes, cooling tower basins, secondary containment	Flexible, tenacious adhesion, superior moisture tolerance	32 hr dry time Topcoat before dries	1 hr/ 1 yr

Polibrid Coatings, Polibrid 705, Elastomeric Polyurethane Aromatic, Chemical Cure, 2	T	0	100	1604 per mil	For concrete and steel in potable water survice	Tough, flexible, corrosion protection, unlimited build (20-250 mils), abrasion resistant, chemical resistant, highly impermeable, thermosetting	15 min touch 2 hr foot traffic	5-8 min/ 1-2 yrs
Polibrid Coatings, Polibrid 706, Elastomeric Polyurethane Aromatic, Chemical Cure, 2	T	0	100	1604 per mil	Over geotextile fabrics for geomembrane liners, urethane foam, concrete and steel	Tough, flexible, forms a highly impermeable membrane, thermosetting, solventless, odorless	15 min touch	7-10 min/ ½-2 yrs
PolySpec, PolySpec 100EX Epoxy, 2	P	0	100	175-200	Concrete primer, as part of a complete TuffRez flooring system or as part of a complete epoxy novolac lining system.	Eliminates solvent odors, low viscosity formulation penetrates and seals concrete pores, provides superior adhesion, high tensile and flexural strengths, moisture tolerant.	48 hr recoat	60 min/ 1 yr
PolySpec, PolySpec 300EX Epoxy Performance Primer, 2	P	54	94	175-200	Concrete primer, as part of a complete TuffRez flooring system or as part of a complete epoxy novolac lining system.	Low viscosity formulation penetrates and seals concrete pores, provides superior adhesion to substrate and higher tensile and flexural strengths when compared to conventional polyamide primers.	4-6 hr set 48 hr recoat	60 min/ 1 year
PolySpec, Thiokol FEC 2233 Flexible Epoxy, 2	I/T	0	100	80-200	Concrete and steel for secondary containment, drum storage, vehicle unloading areas, covered parking decks, warehouse floors, aisles.	Maintains toughness, excellent resistance to chipping, low odor, abrasion reistance. Some chemical resistance.	10 hr tack-free	30 min/ 1 yr
PolySpec, Thiokol FEC 2234 Polysulfide Epoxy, 2	I/T	0	100	100	Concrete and steel for primary containment tanks, secondary containment dikes, loading docks, manufacturing floors, warehouse floors, drum storage areas, vehicle service bays.	Low odor, high abrasion, flexible, excellent chip resistance, penetration and bond strength, resistant to dilute acids, caustics and petroleum solvents, high abrasion resistance.	10 hr tack-free	30 min/ 1 yr
PolySpec, Thiokol FNEC 2369 Epoxy Novolac 2	I/T	0	100	100	Concrete floors, truck loading/unloading areas, secondary containment dikes, pump pads, pedestals, curbs, underground fuel storage tanks.	Superior thermal compatibility with concrete, improved thermal shock resistance, superior flexibility, for aggressive chemical environments.	4 hr tack-free	30 min/ 1 yr
PolySpec, Thiokol FNEC 2515 Polysulfide-Modified Novolac Epoxy 2	I/T	0	100	100	Concrete and steel for above ground tanks, underground fuel storage tanks, tank bottoms, rail car linings, secondary containment.	High impact resistance, excellent resistance to petroleum and urea ammonium nitrate products, flexible, flexible.	16-24 hr recoat	30 min/ 1 yr
PolySpec, Thiokol LPE 5020 Novolac Epoxy Modified Polysulfide, 2	I/T	10	99	80	Concrete and steel for bridges, furel tanks, water tanks, offshore structures, structural steel, antenna towers concrete sturctures, roof coating for tanks & buildings exposed to atmospheric corrosion.	Fast setting elastomeric, low stress cure, easy mix and application, flexibililty beyond conventional, high impact resistance.	2-4 hr recoat	15-20 min/ 6 mos
PolySpec, Thiokol LPE 5100 Polysulfide-Modified Novolac Epoxy 2	P/T	68	94	40	Concrete & steel for bulkheads, pipe piles, H-piles, cranes, in-shore & offshore petrochemical structures, ballast tanks, bridges, water & wastewater structures, marine equipment, industrial & commercial use.	Excellent corrosion, impact, abrasion resistance, fast set time and cure, easy mix.	Plural component sprayer	15-25 min/ /6 mos
PolySpec, TuffRez 232AR Aliphatic WB Polyurethane, 4	T	4	75	450-500	Recommended uses include high traffice manufacturing area, high traffic warehouse floors, corridors & tunnerls, airplane hangars.	Superior wear resistance & durability, minimizes effects of heavy industrial traffic, non-yellowing satin finish with excellent color retention, Zero VOC and low odor.	3-4 hr recoat	45 min/ 6 mo

PolySpec, TuffRez 236 Aliphatic WB Polyurethane, 3	T	4	66	350	Recommended uses include laboratories, hospitals, educational facilities, animal holding areas, chemical processing plants and marine living quarters.	Zero VOC, low odor, ideal for use in confined spaces where occupants are present, UV stable, non-yellowing, resists attacks by most acids, alkalies, detergents, lubricating oils, solvents and chemicals, excellent abrasion resistance.	3 hr recoat	45 min/ 6 mo
PolySpec, TuffRez 238, Epoxy Coating, 2	T	0	100	320	Recommended uses include industrial floors, laboratories, kitchens warehouse floors, traffic aisles, retail store traffic areas.	Orange peel textured finish, diffues light, hides imperfections, seamless, resists many acids, alkalies and salts, easy to clean.	N/A	35 min/ 1 yr
PolySpec, TuffRez 239, Epoxy Coating, 2	T	14	98	320	Recommended uses include industrial floors, light manufacturing areas, automotive service bays, shop areas, entranceways and aisles.	Non-skid texture diffuses light, hides imperfections, seamless, resists mehanical damage from foot traffic, resists many acids, alkalies and salts.	N/A	35 min/ 1 yr
PolySpec, TuffRez 240, Epoxy Liner, 2	P/T	0	100	16	Recommended uses include manholes, large diameter sewer pipes, lift station walls.	Excellent resistance to dilute acids, alkalies, wastewater and swer gas, moisture insensitive.	8 hr tack-free 12 hr recoat	60 min/ 1yr
PolySpec, TuffRez Epoxy Primer	P	0	90	175-250	Recommended for use as a concrete primer, as part of a complete TuffRez flooring system. For industrial and commercial.	Low viscosity formulation penetrates and seals concrete pores, provides superior adhesion.	24 hr recoat	45 min/ 1 yr
PPG High Performance Coatings, 4700 Aquapon Clear Self-leveling Epoxy, 2	P/T	0	100	80-320	Concrete floors	Abrasion and chemical resistant	9 hr touch 12 hr handle 24 hr recoat	30 min/ N/A
PPG High Performance Coatings, SL-99-6680 MEGASEAL Series, Self-leveling Epoxy, Gloss 2	T	4	100	160@10 mils	Properly prepared concrete and masonry, wood substrates, previously painted surfaces	Extremely hard wearing and durable, high chemical resistance, high-build, self-leveling	8 hr recoat 24 hr foot traffic 5 day cure	30 min/ N/A
Premium Coatings, LLC, Premium Liquid Rubber ®, Premium 204 Grade	P/T	0	N/A	N/A	Fully bonds to most substrates. Numerous applications such as corrosion and rust protection of most metals, waterproofing & concrete protection, roofing repairs.	Water based, odorless, non toxic, free of VOC's, single component.	24 hr cure	Single component/ 1 yr
Premium Coatings, LLC, Premium Liquid Rubber ® Spray Grade, 2	P/T	0	N/A	N/A	Numerous applications such as corrosion and rust protection of most metals, waterproofing & concrete protection, roofing repairs.	Highly modified elastomeric asphalt emulsion and chemical reactant. It is water based, odorless, non-toxic, free of VOC's, flexible, high puncture resistance, UV resistant, great chemical resistance, fully bonds to most substrates.	48 hr cure	N/A/ 1 yr
RainGuard International Products Co, VandlGuard Non-Sacrificial Graffiti Coating	T	100	34	200-400	New or Existing masonry, concrete, brick, stucco, stone, metal, wood	Tough and durable, graffiti resistan, cross-linking co-polymer, dries clear, I/E surfaces	1 hr touch 1-2 hr recoat 72-96 hr cure	Single Component
RainGuard International Products Co, VandlTop Sacrificial Graffiti Coating	T	80	N/A	140-300	Masonry, painted surfaces, metal, wood	For I/E surfaces, dries clear, removal using low-pressure hot water	1 hr touch 1-2 hr recoat 36-48 hr cure	Single Component
Rock-Tred, Aqua-Rock Water Based Epoxy, 2	P	46	52	250-300	Interior primer/coating for areas that are subjected to medium to heavy traffic and moderate chemcial spillage.	Waterborne, solvent free, VOC compliant, easy mixing ratio, excellent gloss, moderate chemical and adhesion resistance, fast drying time, good mar resistance, cleans easily.	2-5 hr recoat 7 day cure	30-40 min/ 2 yrs
Rock-Tred, Chem-Rock LT-Seal/Coat Epoxy, 2	S	0	100	150	For moderate traffic and chemical spillage. It can also be used as a faster setting epoxy at ambient termps.	Cures at low temps, fast cure, solvent-free, gloss finish, good chemical and abrasion resistance.	6-8 hr recoat	25 min/ 2 yrs
Rock-Tred, Chem-Rock Polyamide Epoxy, 2	P	0	100	200	For areas that require self leveling or are too cold for Agua-Rock.	Solvent-free, excellent adhesion, damp substrate tolerance.	6-8 hr recoat	15-20 min/ 2 yrs
Rock-Tred, Chem-Rock Seal/Coat Epoxy, 2	S	0	100	150	For areas that are subjected to medium to heavy traffic and moderate chemical spillage. Also used as binder resin.	Solvent free, gloss finish, durable, resistance to yellowing, Moderate chemical and good abrasion resistance.	6-8 hr recoat	30 min/ 2 yrs

Rock-Tred, Chem-Rock Slurry Epoxy, 2	T	0	100	200	For areas that are subjected to medium to heavy traffic and moderate chemical spillage.	Extremely low viscosity, solvent-free, self-leveling, gloss finish, good chemical and abrasion resistance.	6-8 hr recoat	30 min/ 2 yrs
Rock-Tred, Conduroc CR ESD Top Coat Novolac Epoxy, 2	T	0	100	100	for areas that are subjected to heavy traffic, chemical spillage, and/or elevated temps.	Conductive or static dissapative use, excellent chemical, heat and abrasion resistance, solvent-free, odorless, extensive range of colors, gloss finish.	6-8 hr recoat	42 min/ 2 yrs
Rock-Tred, Conduroc ESD Top Coat Epoxy, 2	T	0	100	100	Used in conductive and static dissiptative flooring systems. These electrically conductive floors are commonly found in electronics assembly plants, flammable storage areas and other environments where electrical charge is a concern.	Solvent-free, odorless, conductive or static dissipative use, extensive range of colors, gloss finsh, can be made anti-slip, VOC compliant, good chemical and abrasion resistance.	6-8 hr recoat	30 min/ 2 yrs
Rock-Tred, Eco-Poxi Epoxy, 2	T	0	100	150	Cost-effective coating in epoxy flooring systems with moderate physical abuse.	Solvent-free, long working time.	6-8 hr recoat	30 min/ 2 yrs
Rock-Tred, Elasti-Poxi Membrane Reactive Epoxy, 2	T	0	100	150	Intended for use beneath various Rock-Tred coatings and resurfacers to help bridge fine cracks and to aid in waterproofing concrete floor areas. Designed for use in upper level mechanical equipment rooms and other concrete floor areas requiring waterproofing and resistance to damage.	Flexible, solvent-free, good chemical resistance, durable, fast cure.	6-8 hr recoat	30-35 min/ 2 yrs
Rock-Tred, Exteseal Water Based Silane-Modified Siloxane	S	0	13	500-1000	Used on ceramic tile, tile grout, limestone, concrete, masonry, brick or any other porous surface that requires moisture vapor transmission and stain resistance.	Odorless, easy to apply, clear liquid, stain repellent.	1 hr recoat	Single Component/ 2 yrs
Rock-Tred, Novo-Brite Clear Novolac Epoxy, 2	T	12	100	150	For areas that are subjected to heavy traffic, chemical spillage, and/or elevated temps.	Excellent chemical resistance, solvent-free, gloss finish, abrasion resistant.	6-8 hr recoat	25 min/ 2 yrs
Rock-Tred, Novo-Poxi Novolac Epoxy, 2	T	12	100	135	For areas that are subjected to heavy traffic, chemical spillage, and/or elevated temps.	Chemical & abrasion reisstant, solvent-free, gloss finish.	6-8 hr recoat	25 min/ 2 yrs
Rock-Tred, Novo-Poxi LT Novolac Epoxy, 2	T	12	100	135	For areas that are subjected to heavy traffic, chemical spillage, and/or elevated temps.	Cures at low temps, solvent free, gloss finish, excellent chemical & abrasion resistance.	6-8 hr recoat	25 min/ 2 yrs
Rock-Tred, Penetred Water Based Penetrating Epoxy, 2	P/S	0	38	400	Recommended as a fast curing primer for other Rock-Tred producs, or as a stand alone sealer in areas that are subjected to medium to heavy traffic and moderate chemical spillage.	Solvent free, fast drying time, applies to damp concrete, good abrasion resistance, eliminates concrete dust, excellent UV resistance, excellent sealer for stained concrete, moderate chemical & abrasion resistance, good mar resistance.	1-2 hr recoat	40-50 min/ 6 mos
Rock-Tred, Poxi-Rock CR-Flooring Epoxy, 3	P	0	100	200	Floor coating which cures chemically to an extremely tough, corrosion and abrasion resistant surface.	Excellent chemical and temp resistance, high compressive strength, cures fast, good chemical resistance.	3-4 hr recoat	18-20 min/ 2 yrs
Rock-Tred, Poxi-Rock CR-Primer Epoxy, 2	P	8	100	200	Recommended as a primer for Poxi-Rock CR-flooring.	Solvent-free, odorless, excellent adhesion, VOC compliant.	6-8 hr recoat	15-20 min/ 2 yrs
Rock-Tred, Poxi-Rock CR-Top Dressing Thixotropic Novolac Epoxy, 2	T	12	100	150	Generally used as the primary top dressing over a newly installed flooring system to increase chemical and abrasion resistance, cleanability, as well as enhance the aesthetics.	Orange peel texture, solvent free, extensive range of colors, gloss finish, good chemical and abrasion resistance.	6-8 hr recoat	25 min/ 2 yrs

Rock-Tred, Poxi-Rock Flooring Epoxy, 3	T	12	99	200	Easily hand troweled mortar which cures chemically to an extremely tough, corrosion and abrasion resistant surface.	Wears 10x better than concrete, high compressive strength, cures fast, good chemical resistance, VOC compliant.	4-5 hr recoat	20-22 min/ 2 yrs
Rock-Tred, Poxi-Rock LT-Flooring Thixotropic Epoxy, 2	T	0	100	200	Easily hand troweled mortar which cures chemically to an extremely tough, corrosion and abrasion resistant surface.	Wears 10x better than concrete, high compressive strength, cures fast, good chemical resistance, VOC compliant.	6-8 hr recoat	30-40 min/ 2 yrs
Rock-Tred, Poxi-Rock LT-Primer Epoxy, 2	P	0	100	200	Recommended as a primer for Poxi-Rock LT flooring.	100% solids, solvent -free, odorless, excellent adhesion, VOC compliant.	6-8 hr recoat	30-40 min/ 2 yrs
Rock-Tred, Resn-X Dressing, Novolac based Vinyl Ester, 2	T	74	97	200	The required final coat for Rock-Tred's viny ester coating systems.	Resistant to harsh chemicals, smooth or anti slip finishes, excellent wear resistance, low gloss.	6-8 hr recoat	15 min/ 2-3 mos
Rock-Tred, Resn-X Intermediate, Novolac based Vinyl Ester, 2	I	74	97	200	Recommended for Rock-Tred's vinyl ester coating systems.It is used primarily to build thickness in a vinyl ester coating system.	VOC compliant, resistant to harsh chemicals, smooth or anti slip finishes, excellent wear resistance, low gloss.	6-8 hr recoat	15 min/ 2-3 mos
Rock-Tred, Resn-X Primer, Novolac based Vinyl Ester, 2	P	74	97	200	The recommended primer for Rock-Tred's vinyl ester coating systems.	Resistant to harsh chemicals, smooth or anti slip finishes, excellent wear resistance, low gloss.	6-8 hr recoat	15 min/ 2-3 mos
Sherwin Williams, 1.22 DTM Bonding Primer, WB Acrylic Emulsion	P	51	42	135-335	Pre-finished and previously painted metal siding	Must be topcoated, corrosion resistant, adhesion promoting	1 hr touch 8 hr recoat 7 day cure	Single Component/ 36 months
Sherwin Williams, TRM.51 Magnaplate, Vinyl Ester Novolac Laminate System, 2	T	40	100	100	Steel storage tanks, lining system for secondary containment applications	Chemical resistant withstanding wide range of crude and refined petroleum products	30-60 min touch 1-2 day cure	37 min/ 3 months
Sherwin Williams, 1.27 Bond-Plex WB Acrylic Coating	T	48	41	164-329	Pre-finished and previously painted metal siding	Outstanding early moisture resistance and exterior durability and gloss retention, fast dry, very good mar resistance	45 min touch 4 hr recoat 7 day cure	Single Component/ 36 months
Sherwin Williams, 2.30 Tower-Guard HS Oil/alkyd Coating Transmission Tower Coating B54AZ600	T	70	89	145-240	Electrical towers, substation towers, poles, fences, duct work	Corrosion resistant, excellent exterior durability, high build, single coat application	12-24 hr touch 30 day recoat	Single Component/ 12 months
Sherwin Williams, 5.30 Centurion, WB Urethane High Gloss 2	T	66	58	310-460	Prepared substrates in industrial and marine environments	Abrasion resistant, excellent weathering properties	1½ hr touch 8 hr recoat 10 day cure	2 hr/ 1 yr
Sherwin Williams, 6.11 Zinc Clad XI, WB Inorganic Zinc-Rich Coating 2	P	0	68	220-365	Properly prepared blasted steel	Abrasion and corrosion resistant	15 min touch 2 hr recoat 2 hr cure	4 hrs/ 1yr (part E), 2 yr (part F)
Sherwin Williams, 8.11 Armorseal WB Epoxy Primer/Sealer, 2	P	<20	87	200	Concrete or wood, previously painted surfaces	Abrasion resistant, excellent adhesion, fast dry, chemical and solvent resistant, impact resistant	4-6 hr touch 6-48 hr recoat 7 day cure	30 min/ 12 months
Sherwin Williams, 8.20 Armorseal 33 Epoxy Primer/Sealer, 2	P	0	100	200	Concrete, masonry	Abrasion resistant, excellent adhesion, fast dry, chemical resistant, impact resistant,	4-6 hr touch 6-24 hr recoat 7 day cure	30 min/ 18 months
Sherwin Williams, 8.25 Armorseal 650 SL/RC, Self-leveling Recoatable Epoxy, 2	T	3	100	50-160	Concrete, steel	Excellent adhesion, chemical and solvent resistant, seamless-high build durable coating	6-12 hr touch 8-72 hr recoat 7 day cure	40 min/ 18 months
Sherwin Williams, 8.50 Armorseal Armor-Plex WB Urethane, 2	T	41	58	309-464	Concrete, masonry	Highly flexible, high gloss, chemical and abrasion resistant, excellent color and gloss retention	½-1hr touch 6-14 hr recoat 16-48 hr traffic	2 hr/ 12 months

Sherwin Williams, TRM.17 Cor-Cote HP FF Flake Filled Epoxy, 2	T	0	100	100-160	Protection of concrete and steel surfaces in immersion and atmospheric exposure in tank linings, secondary containment and process flooring	Stain resistant, chemical resistant, low viscosity, low permeation, high gloss	6 hr touch 8-16 hr recoat 7 day cure	25 min/ 18 months
Sherwin Williams, TRM.33 Dura-Plate UHS Primer, Ultra High Solids Epoxy Amine 2	P/I	40	98	200-400	Ballast tank interiors, potable water tanks and pipes, oil tank, and refined fuel storage tank interiors, pulp and paper mills, water and wastewater treatment plants, containment areas	Excellent surface wetting & adhesion, formulated as a primer under Dura-Plate UHS topcoat	5 hr touch 16 hr recoat 4 day cure	45 min/ 36 months
Sherwin Williams, TRM.37 Nova-Plate UHS Primer Ultra High Solids Epoxy novolac amine, 2	P	12	98	133-262	For use over prepared steel in industrial and marine exposures such as ballast tank interiors, well deck overheads, oil storage tank interiors, refined fuel storage tank interiors, containment, CHT tanks	Excellent surface wetting and adhesion, expecially over rust pitted steel surfaces	4 hr touch 14 hr-21 day recoat 5 day cure	40 min/ 12 months
Sherwin Williams, TRM.38 Nova-Plate UHS Ultra High Solids Epoxy novolac amine, 2	T	12	98	98-160	For use over prepared steel in industrial and marine exposures such as ballast tank interiors, well deck overheads, oil storage tank interiors, refined fuel storage tank interiors, containment, CHT tanks	High build, edge retentive properties provide superior protection compared to conventional epoxies	3 hr touch 14 hr-21 day recoat 5 day cure	40 min/ 12 months
Sherwin Williams, TRM.72 Corobond LT Low Temp Epoxy, 2	P	0	100	200-400	For immersion or atmospheric exposure for epoxy and polyurea coatings on concrete, masonry	Blush resistant, low temp cure, moisture tolerant cure, low viscosity, fast cure	2 hr touch 18 hr recoat 7 day cure	25 min/ 18 months
Sherwin Williams, TRM.73 Corobond 100 Epoxy P/S	P	13	98	265-400	Concrete surfaces for secondary containment	Fast dry, superior penetrating characteristics, helps prevent blow-back and outgassing	2 hr touch 3-24 hr recoat 7 day cure	45 min/ 18 months
Sherwin Williams, TRM.74 Corobond Conductive Epoxy Primer, 2	P	0	100	400-800	Concrete substrate to provide uniform electrical conductivity	Excellent bond to concrete substrate, long working time	5 hr touch 48 hr recoat 7 day cure	60 min/ 18 months
Sherwin Williams, TRM.77 Cor-Cote E.N. 7000 High Build Epoxy Novolac Coating, 2	T	0	100	115-160	Protection of steel, concrete floors, walls	Excellent adhesion, high build, chemical resistant, abrasion resistant, corrosion resistant	6-8 hr touch 8 hr recoat 7 day cure	30 min/ 18 months
Sherwin Williams, TRM.78 Sher-Tuff Epoxy Flexible Coating, 2	P	0	100	60-80	Kitchens, clean rooms, storage areas, packaging areas, locker rooms, showers, loading docks, secondary containment	Tough, chemical resistant	5 hr touch 6-12 hr recoat 48 hr cure	90 min/ 12 months
Sherwin Williams, TRM.79 Sher-Tuff Urethane Enamel Coating, 2	T	0	100	320-533	Structure steel, tank exteriors, steel, equipment, steel and iron pipe exteriors, metal decking, secondary containment	High chemical resistance	3 hr touch 8-16 hr recoat 3 day cure	35 min/ 12 months
Sherwin Williams, TRM.85 EnviroLastic AR425, 2	I/T	0	100	Jun-53	Tanks, marine bridges, decks, aquariums, mechanical rooms, manhole linings, basins, reservoirs, theme parks	Aromatic polyurea coating, tough, flexible, impact resistant, waterproof, for immersion or atmospheric exposure	45 sec touch 4 hr recoat 24 hr cure	None/ 12 months
Sherwin Williams, TRM.86 EnviroLastic AR200 HD, 2	T	0	100	6-160	Tanks, marine bridges, decks, aquariums, mechanical rooms, manhole linings, basins, reservoirs, theme parks	Aromatic polyurea coating, tough and elastomeric, fast cure, impact, tear and abrasion resistant, chemical resistant, bridges cracks	12 sec touch 4 hr recoat 24 hr cure	None/ 12 months
Sherwin Williams, TRM.88 EnviroLastic AR520 SS, 2	P/I	0	100	6 to 53	Interior/Exterior floors and decks	Aromatic polyurea coating, tough and elastomeric, fast cure, impact, tear and abrasion resistant, chemical resistant, bridges cracks	3 min touch 4 hr recoat 24 hr cure	None/ 12 months
Sherwin Williams, TRM.90 EnviroLastic AL450 SS, 2	T	0	100	Jun-53	For seamless floors, walls, and ceilings	Aliphatic polyurea coating, extraordinary toughness and elastomeric performance, waterproof, bridges cracks	3 min touch 4 hr recoat 24 hr cure	None/ 12 months

Sherwin Williams, TRM.91 EnviroLastic AR520 PW, 2	T	0	100	6-53@ 20-250 mils	Pipes, steel and concrete tanks, concrete reservoirs, brine tanks, aquariums, ponds, fish hatcheries	Aromatic polyurea coating, fast cure, seamless, flexible, waterproof	3 min touch 3 min recoat 24 hr cure	None/ 12 months
Specialty Products, Inc., Durashield II, Acrylic Elastomeric Coating	T	0	60	100@9-10 mills	Wooden substrates, asphalt surfaces, masonry and concrete, protective coatings for foam pipes, roofing, tank insulation	Fire retardant, excellent adhesion, breathable membrane, exceptional weatherability, resists mechanical damage and chemical attack, high build capabilities	4 hr touch 12 hr tack free 12-24 hr recoat	N/A/ 12 months
Specialty Products, Inc., EP-100 Primer, 2	P	0	100	800@2 mils	Concrete	Superior adhesion, easy to use	12-24 hr tack free 12-24 hr recoat	30 min/ 12 months
Specialty Products, Inc., Hard CAP-100, Clear Aliphatic Polyurea 2	T	0	100	100@16 mils	Floors, walls, ceilings, clean rooms, hospitals, fountains, reflection pools, aquariums	Extended tack time for penetration, high temperature stability,	1 hr tack free ½-12 hr recoat	N/A/ 6 months
Specialty Products, Inc., Polyshield HT, Elastomeric Polyurea, 2	T	0	100	100@16 mils	Steel, concrete tanks, ponds, lagoons, reservoirs, barges, encapsulation	Extended tack time for penetration, high temperature stability, high abrasion resistance	60 sec tack free 0-12 hr recoat	N/A/ 6 months
Specialty Products, Inc., Watershield 100, Elastomeric Polyurea, 2	P/I	0	100	100@16 mils	New or existing subgrade slabs and walls, buried earthen containment lining used with or without geotextile, rock shield for pipelines, liner for ponds, lagoons, tunnels, ditches, encapsulation	Hydrophobic, built to any thickness in one application, high temperature stability, high elongation for crack bridging, excellent encapsulation	15 min to handle 0-48 hr recoat	N/A/ 6 months
Superior Environmental Products, EC-315 NovoSeal	T	0	100	12.8	Chutes, fan housing blades, dry bag-house ducts, pump rebuilding, slurry tanks, ideal for concrete	high-density, ceramic-filled, excellent chemcial wear and abasion resistance	½-2 hr recoat 48 hr immersion 120 hr chemical	30 min
Superior Environmental Products, ER-1000R NovoFlex	P	0	100	160	Concrete base coat, asphalt/metal/concrete topcoat for floors, foundations, secondary containment, cooling towers and pipes	Elastomeric, contains recycled ground rubber, excellent adhesion, long-term water resistance	24 hr recoat 7 day cure	1 hr
Superior Environmental Products, SC-1100 NovoPro Novolac Primer	P	0	100	300-500	Porous concrete at petro-Chemical and Refining industries, ideal for floors and secondary containment, slow cure	Penetrating, excellent chemical and heat resistance, for immersion service, bond both chemically and mechanically,	12-15 hr touch 5-12 hr recoat 7 day full cure	4 hrs
Superior Environmental Products, SC-3100 NovoFloor	P	0	100	160	Excellent coating for high traffic floor areas, secondary containment	Excellent chemical and heat resistance, excellent wear resistance	1 hr 50 min recoat 72 hr immersion 7 day cure	42 min
Superior Environmental Products, SC-3300 NovoPro	P/T	0	100	160	Excellent tank liner at petro-chemical and refining industries	Long term chemical resistance and immersion service	1-1½ hr recoat 30 hr immersion 7 day cure	30 min
Superior Environmental Products, SC-3406 NovoPro	P/T	0	100	160	Immersion service at petro-chemical and refining industries, stacks, ducts, chemical line, brin/slurry tanks	Excellent chemical and heat resistance, excellent wear resistance	½-3½ hr recoat 30 hr immersion 7 day cure	30 min
Superior Environmental Products, SC-5400 NovoStar	P/T	0	100	160	Floors, ducts, wet scrubbers, secondary containment, steel/concrete tanks, process vessels, storage tanks	Maximum heat and chemical resistance, excellent wear resistance	1-1½ hr recoat 30 hr immersion 7 day full cure	1 hr
Superior Environmental Products, SP-2000R NovoTower, contains rubber additive	P//T	0	100	160	Ideal for concrete in aqueous service such as cooling towers, waste-water management, wet wells, manholes	Excellent chemical and heat resistance, superior cond both mechanically and chemically to the substrate, excellent wear resistance	24 hr recoat 3 day immersion 7 day chemical	1 hr, 5 min
Tamms Industries, Duralkote 240, High Build Flexible Epoxy, 2	T	0	100	100-150	For walls and floors in truck/auto bay areas, food service plants, water treatment plants, breweries and all areas where easy clean up is essential.	High build, flexible, excellent chemical and abrasion resistance.	4-6 hr tackfree	15-25 min/ 2 years
Thortex America, Inc., Chemi-Tech 152 L.V. Epoxy, 2	P/T	0	100	21.5	For steel and concrete structures with a minimum of surface prep. Can be applied to damp steel surfaces and offers a high tolerance to manually prepared substrates.	High performance, solvent free, corrosion resistant, exceptional application and film rebuild properties.	12 hr touch 7 day full cure	indefinite

Thortex America, Inc., Chemi-Tech C.R. Epoxy, 2	P/T	0	100	43	For steel and concrete tanks, containment areas, steelwork and floors.	High performance, solvent free, excellent adhesion, abrasion and erosion resistant.	3-4 hr touch 7 day full cure	5 yrs
Thortex America, Inc., Chemi-Tech E.P. Epoxy, 2	P/T	0	100	43	For concrete and metal tanks, containment, sewage treatment equipment, channels, pipework, tank pads, storage pits.	High performance, solvent free, good physical properties and chemical resistance.	6 hr touch 7 day full cure	5 yrs
Thortex America, Inc., Chemi-Tech P.U. Polyurethane, 2	P	0	100	21	For use as a lining system for tanks, containment areas and steelwork.	High performance, solvent free, exceptional resistance to chemical and corrosion.	2 hr touch 7 day full cure	5 yrs
Thortex America, Inc., Chemi-Tech U.C. Epoxy, 2	P/T	0	100	31	For steel and concrete tanks, pipework, containment dykes, bund areas, desulphurisation units, etc.	High performance, solvent free, excellent adhesion, outstanding resistance to a wide range of industrial chemicals.	7 day full cure	5 yrs
Thortex America, Inc., Chemi-Tech U.S.R. Epoxy, 2	P/T	0	100	17.5	For steel and concrete tanks, pipework, containment dykes, bund areas, where contact with solvents is likely.	High performance, solvent free, excellent adhesion, outstanding resistance to a wide range of industrial chemicals.	7 day full cure	5 yrs
Thortex America, Inc., Chemi-Tech U.W. Epoxy 2	P/T	0	100	43	Designed for use as a corrosion resistant lining for structures operating in underwater environments.	High performance, solvent free, abrasion and erosion resistant.	6 hr touch 7 day full cure	Indefinite
Thortex America, Inc., Corro-Tech G.P. Solvent Based Epoxy, 2	P/T	78	90	75	Long term protection system for new and existing steel structures where surface preparation is restricted.	High performance, anti-corrosive coating, optimum adhesion, weather and corrosion resistance in virtually any environment.	6 hr touch 7 day full cure	5 yrs
Thortex America, Inc., Corro-Tech W.B. Epoxy, 2	P	40	45	86	Designed to provide long term protection to a wide range of metallic surfaces.	High performance, anti-corrosive water-born coating, excellent adhesion to a wide range of ferrous and non ferrous surfaces.	1 hr touch 7 day full cure	5 yrs
Thortex America, Inc., Floor-Tech F.B. Polyurethane, 2	I/T	0	100	43	Developed for use as a high build flexible floor coating.	High performance, solvent free, ceramic reinforced, excellent adhesion.	5 hr touch	5 yrs
Thortex America, Inc., Floor-Tech H.B. Epoxy, 2	P/T	0	100	53	For long term floor protection. Ideal for use in dairies, breweries, canteens, food factories, pharmaceutical plants and warehouses, etc.	High performance, solvent free, ceramic reinforced, optimal level of adhesion, abrasion, impact and chemical resistance.	6 hr touch 7 day full cure	5 yrs
Thortex America, Inc., Floor-Tech S.P. Epoxy Primer 2	P/S	0	100	102	Coating designed for multipurpose floor sealing and priming system. Can also be used to create a damp proof membrane for concrete floors prior to overlayment with cementitious screeds.	High performance, low viscosity, solvent free, optimum level of penetration, adhesion and overcoatability.	2 hr touch 7 day full cure	5 yrs
Thortex America, Inc., Floor-Tech W.B. Epoxy, 2	T	0	50	108	Designed for use as a cost effective durable floor protection system. Ideal system for concrete, quarry tiles or previously painted surfaces where a durable easy clean surface is required.	High performance, water-based, ceramic reinforced, optimal adhesion, abrasion, impact and chemical resistant and durable.	4 hr touch 7 day full cure	5 yrs
Thortex America, Inc., Floor-Tech W.B.X. Epoxy, 2	P/T	44	50	107	Designed for use on most floor surfaces.	High performance, fast curing, self priming, low gloss coating system, excellent adhesion and durable.	1-2 hr touch 7 day full cure	5 yrs
Thortex America, Inc., Uni-Tech G.P. Epoxy Primer, 2	P	0	45	121	Specifically developed to act as a tie coat over existing coated surfaces and non porous substrates including tiles, brickwork, plaster and powerfloated concrete.	High performance, multi purpose, water-based, outstanding adhesion to a wide range of surfaces which can be overcoated with a wide variety of Thortex systems.	4 hr touch 7 day full cure	5 yrs
Thortex America, Inc., Wall-Tech A.G. Water-Based Polyurethane, 2	T	65	17	121	Designed for applicaton to masonry.	A high performance graffiti resistant coating, outstanding adhesion, fast drying.	30 min touch 7 day full cure	1 yr

Thortex America, Inc., Wall-Tech F.P. Single Component Water-Based Weatherproofing Coating	S	0	60	28.5-43	Protection for external walls and internal walls and ceilings. Exterior masonry surfaces including concrete, plaster, brick and asbestos cement.	High performance flexible protection system for external walls, outstanding weatherproofing properties with optimum levels of UV resistance, flexibility, adhesiona dn durability.	30 min touch	5 yrs
Thortex America, Inc., Wall-Tech U.V. Water-Based Polyurethane, 2	T	65	50	107	Designed for use on external and internal wall surfaces. Can be applied to any type of wall surface when applied in conjunction with Thortex Primers.	A high performance water based coating, outstanding weather, chemical and abrasion resistance with excellent gloss, graffiti resistance and color stability.	4 hr touch 7 day full cure	5 yrs
Van Technologies Inc, Isocrete Moisture Curable Polyurethane	T	39	N/A	N/A	Dry concrete, aluminum and other metals	High degree of elongation and tensile strengh, excellent bridging over minor cracks, protects over expansion and contraction	6 hr tack free 24 hr cure	None
ZRC, Galvanizing Compound Flat Metallic Zinc Coating, 1 part liquid : 3.1 parts zinc powder	P	0	44	232	Apply to carbon steel, cast iron and aluminum. Not recommended for hot-dip galvanizing surfaces	Pencil Hardness 4B, anti-corrosion protection, UV resistant	15 min touch 24 hr recoat 4 hr cure	24 hrs/ 2 years

N/A= Not Available 288

Nonflats (High Gloss ≤ 50 g/l)

Coating Company and Product Name	Interior Exterior	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Recommended Substrate/Exposure	Coating Characteristics	Dry time to recoat
EPMAR, Kemiko WB Acrylic Urethane High Gloss (44-C) colored with Degussa, Aqua-Chem 895	I/E	0	30	300-400	Concrete, plaster, properly primed metals, wood trim and furniture, bridges	UV, abrasion and stain resistant, excellent leveling and flow properties	1 hr
Kwal Paint (PPI), 1870 Latex Semi-Gloss Stipple, Vinyl Acrylic Emulsion	I/E	0	37	300-400	Plaster, drywall, concrete, masonry, wood, properly primed metal and exterior trim	Sheen 70+ @ 60º, non-yellowing, excellent durability, superior hiding	4 hr dust free 24 hr recoat
Resene Paints Limited, D31a Wintergrade Hi-Glo, Gloss 100% Acrylic Emulsion	E	17	N/A	489	Siding, timber, plywood, concrete, plaster, fiber cement, stucco, block, brick, particleboard, properly primed galvanised steel and aluminum, for repainting	Good chemical and solvent resistance, very good abrasion resistance, excellent durability, outstanding flexibility, inhibits mold growth	dependent on weather conditions
Sierra Performance (Rust-Oleum), S39 Beyond Multi-Purpose Enamel WB Gloss Acrylic Urethane	I/E	0	37	165-520	Doors, cabinets, trim, furniture, equipment, tanks, properly primed steel	Excellent durability, non-blocking, mar resistant	2-4 hrs
Sierra Performance (Rust-Oleum), S-50 Brushing and S-51 Spray WB Epoxy High Gloss Enamel, 2	I/E	0	45	200-300	For the corrosion protection of equipment and other steel surfaces, may also be used on concrete and previously coated surfaces.	Excellent chemical and corrosion resistance, exceptional durability, good chemical and stain resistance against moderate corrosive and chemical environments, 4 hr pot life	30 min touch 2-4 hr recoat

N/A= Not Available 5

Nonflats (Medium Gloss ≤ 50 g/l)

Coating Company and Product Name	Interior Exterior	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Recommended Substrate/Exposure	Coating Characteristics	Dry time to recoat
American Formulating and Manufacturing Safecoat Semi Gloss Zero VOC	I	0	N/A	350	Walls, ceilings, wallboard, properly cured and primed plaster, masonry and primed metal	Superior durable finish, odor free	1 hr touch 4 hr recoat

Benjamin Moore, 224 Pristine Eco Spec Acrylic Latex Semi Gloss Enamel	I	12	36	400-450	Wood, plaster, masonry, properly primed metal	High hiding, durable, washable, spatter resistant	2 hrs
California Paints, Fres-Coat Acrylic Semi Gloss 663XX	I	35	39	250-400	Plaster, sheetrock, wallboard, concrete, masonry block, wood, primed metal, galvanized metal, acoustical surfaces	Sheen 45 @ 60°, extremely durable, anti-spatter, superior leveling, adhesion, color retention & scrubbability	2 hrs
Cloverdale Paint, 70723 Semi Gloss Latex	I	0	52	340-500	For Institutional and public buildings such as schools, institutions, hospitals, hotels, offices, residential homes.	Semi-gloss	30 min touch 8 hr recoat
Color Wheel Paints & Coatings, 5520 Hi-Hide Low VOC Wall Paint Vinyl Acrylic Latex	I	1	37	300-500	Concrete, masonry, wood surfaces, gypsum wallboard, properly primed ferrous metals, aluminum, and galvanized metals	Sheen 30-40 @ 60°, outstanding touchup, exceptional hiding, scrubbable, washable	4 hrs
Columbia Paint & Coatings, Professional Pro-Choice Vinyl Acrylic Latex Semi-Gloss 02-792	I	46	31	325	Wood, drywall, plaster, masonry, concrete, properly primed metal	Sheen 24-32 @ 60°, excellent touch-up, dries rapidly	2-4 hrs
Columbia Paint & Coatings, Purecoat Low Odor Acrylic Semi-Gloss 05-572	I	0	40	360	Wood, drywall, plaster, masonry, concrete, properly primed metal	Sheen 45-55 @ 60°, very good flow and leveling, good hiding, excellent spatter resistance, excellent stain removal and adhesion	12-16 hrs
Coronado Paints, 926-1 Air Care Odorless Acrylic Semi-Gloss	I	0	39	450	Walls, woodwork, drywall, plaster, masonry, proper primed metal	Sheen 45-55 @ 85°, flows easily, excellent hiding power, dries quickly, scrubbable	30 min touch 4 hr recoat
Diamond Vogel Paints, DS-1591 Health-Kote Low Odor Semi-Gloss Latex White Base	I	0	39	313-417	Drywall, plaster, concrete/masonry, wood	Semi-gloss finish, durable, excellent washability	1-2 hr touch 6 hr recoat
Dunn Edwards, W 550 Sierra Acrylic Semi-Gloss Enamel	I	0	38	350-400	Drywall, masonry, wood, properly primed metal	Excellent hide, good adhesion	1-2 hr touch 2-4 hr recoat
Dunn Edwards, W 603 Ecoshield Acrylic Semi-Gloss	I	8	38	350-400	For residential and commercial office buildings, schools, hospitals, residential and other closed ventilated buildings on drywall, masonry, wood metal.	Low VOC and odor, no added solvents, provides a durable, washable film and has excellent hide, block resistance, and adhesion.	1-2 hr touch 4-6 hr recoat
Duron Paints & Wallcoverings, 83 Line, Acrylic Latex Semi-Gloss Enamel	I	15	39	400	Walls, ceilings, trim, woodwork	Scrubbable, resistant to household dirt & stains, mildew resistant	1 hr touch 4 hr recoat
Frazee Paint (PPI), 032 Envirokote Semi Gloss Finish	I	6	36	200-400	Concrete, masonry, drywall, hardboard, properly primed metal, plaster, wood	Sheen 60-70 @ 60°, resistant to abrasion, blocking, washing, yellowing	2-4 hr touch 18 hr recoat
General Paint (PPI), 54-020 HP3000 Semi-Gloss AcrylicFinish	I	7	35	275-370	Interior applications in high wear areas such as schools, hospitals, care facilities, public areas and institutions	Excellent hiding power, incredible scrub resistance, sperior application properties, outstanding adhesion, fast dry, low odor	15-30 min touch 1 hr handle 2-4 hr recoat
General Paint (PPI), 59-020 Z-Coat Semi-Gloss 100% Acrylic	I	6	35	275-370	Interior applications in high wear areas with high maintenance such as schools, hospitals, care facilities, public areas and institutions	Durable, fast-drying, washable	15-30 min touch 1 hr handle 2-4 hr recoat
Hallman Lindsay Quality Paints, 281 Comfort Kote Vinyl/Acrylic Semi-Gloss	I	0	39	350	Walls and ceilings made of drywall, plaster or masonry and wood surfaces	Sheen 30-40 units @ 60°, Excellent hiding and touch-up, good stain removal and washability	2 hr touch 4 hr recoat
Hallman Lindsay Quality Paints, 296 Latex Semi-Gloss Enamel	I	33	35	400	For walls, ceilings and trim, wood, drywall, masonry and metals.	High-hiding, low-odor, quick-drying, soap and water clean-up, scrubbable.	1 hr touch 4 hr recoat
ICI Paints (Dulux), 1486-1200 Spraymaster Pro, Uni-Grip-WB Aquacrylic Dryfall Semi-Gloss Primer & Finish	I/E	39	40	350-450	For ceilings and multiple overhead surfaces such as those in offices warehouse, stores, hotels, textile mills and industrial plants, suitable for galvanized decking.	Excellent adhesion, resists flash rusting, easy clean-up of overspray, low odor, good moisture resistance.	15 min touch 2 hr recoat

ICI Paints (Dulux), 2000 Lifemaster Semi-Gloss	I	0	39	400	Interior walls and ceilings	Bonds to glossy surface, excellent washability, excellent stain resistance, good block resistance, quick drying, durable	2-4 hr touch 6-8 hr recoat
Innovative Formulations Company, Semi-Gloss, WB Acrylic Urethane	I/E	0	N/A	400-450	Drywall, plaster, concrete, most masonry surfaces, covers properly primed wood & metal	One coat, fast dry, strong adhesion, excellent weather-ability, durability, scrub resistance, Sheen 30-40 @ 60^{o}	1 hr touch 2 hr recoat 24 hr hard dry
Innovative Formulations Company, Mold Not, High Gloss Paint, WB Mult Shell Acrylic	I	0	N/A	400-450	Drywall, plaster, concrete, most masonry surfaces, covers properly primed wood & metal	Resistance to fungi, one coat, fast dry, strong adhesion, excellent weather-ability, durability, scrub resistance, Sheen 50 @ 60^{o} according to manufacturer.	1 hr touch 2 hr recoat 24 hr hard dry
Innovative Formulations Company, Mold Not, Semi-Gloss Paint, WB Mult Shell Acrylic	I	0	N/A	400-450	Drywall, plaster, concrete, most masonry surfaces, covers properly primed wood & metal	Resistance to fungi, one coat, fast dry, strong adhesion, excellent weather-ability, durability, scrub resistance, Sheen 30-65 @ 60^{o}	1 hr touch 2 hr recoat 24 hr hard dry
Kelly-Moore Paints, 1520 Envirocote Acrylic Semi Gloss Enamel	I	0	39	300-400	Wallboard, plaster, masonry, walls, trims	Sheen 50-55 @ 60^{o}, non-polluting, anti-microbial properties	1 hr touch 4 hr recoat
Lanco Paints, OF-260 Acrylic Semi-Gloss Latex Enamel	I	40	31	450	Kitchens, bathrooms, and playrooms	Durable and tough, mildew and stain resistant, chalk resistant superior scrubbability, fast drying	30 min touch 4 hr recoat
Miller Paint Company, #M2850 Acro Semi-Gloss Latex	I	5	34	300-350	Hospital rooms, nursing homes, classrooms, kids rooms, bathroom, kitchens	Antimicrobial, non-yellowing, long term durability, excellent leveling and flow	1 hr touch 4 hr recoat
Miller Paint Company, #M5500 Kril-Coat Semi-Gloss Latex	E	50	32	250-400	Wood siding and trim, properly primed metal	Excellent durability, color retention and adhesion	1 hr touch 4-6 hr recoat
Miller Paint Company, #M6150 Super Acro Semi-Gloss Latex	I	5	40	400-500	Ideal for high-traffic areas such as den, bathroom, kitchen	Antimicrobial, outstanding hide, splatter resistant, good durability and washability, solvent free	1 hr touch 6 hr recoat
Morwear Manufacturing Inc, 190-01 Semi-Gloss 100% Acrylic Wall & Trim Enamel	I	12	44	300-400	Walls, trim, masonry, drywall, plaster, concrete, primed wood, primed metal, previously painted surfaces	Semi-gloss finish, superior hide, stain resistant, maximum durability	½-1 hr touch 4 hr recoat
Parker Paint (PPI), 5950 Premium Great Northwest Klean-Air Latex Coating (Vinyl Acetate)	I	2	31	300-350	Walls and ceilings, wood work and trim, masonry, concrete	Sheen 50-60 @ 60º, environmentally friendly	1 hr tack free 4 hr recoat
Pittsburgh Paints (PPG), 9-500 Series Pure Performance Semi-Gloss Acrylic Latex	I	0	37	350-400	For residential and commercial use on aluminum, concrete, drywall, ferrous metal wood galvanized steel, masonry, plaster, stucco.	Zero VOC, low odor, excellent hiding, touch up, anti-microbial properties.	2 hr touch 6 hr recoat
Pittsburgh Paints (PPG), 9-510 Series Pure Performance Acrylic Semi-Gloss Latex	I	0	37	400-450	Properly primed aluminum, galvanized steel, ferrous metal, plaster, wood, concrete, masonry, stucco, drywall,	Sheen 25-35 @ 60^{o}, excellent adhesion and hiding power, scrubbable, anti-microbial	1 hr touch 4 hr recoat
Rodda Paint Company, 533501 Horizon Low Gloss, Acrylic Emulsion	I	4	40	320	Walls and woodwork	Sheen 45-55 @ 60º, low odor, enamel finish, non-toxic, good resistance	½ hr touch 2 hr recoat
Rodda Paint Company, 543501Horizon Semi Gloss	I	4	40	320	Walls and woodwork	Sheen 25-35 @ 60º, low odor, enamel finish, non-toxic, good resistance	½ hr touch 2 hr recoat
Sherwin Williams, 101.60 Harmony Styrenated Acrylic Latex Semi Gloss B-10 Series	I	0	40	350-400	Block, drywall, masonry, plaster, wood	Sheen 35-45 @ 60º, anti-microbial	1 hr touch 4 hr recoat
Sherwin Williams, 101.69 Duration Home, Latex Semi Gloss A98-100 Series	I	39	35	350-400	For masonry, concrete, cement, block, drywall, plaster, wood, composition board	Resistant to stains, scuffs, burning, smooth even finish, anti-microbial	1 hr touch 4 hr rrecoat
Sherwin Williams, 102.23 Duration Latex Gloss, K34 Series	E	50	40	250-300	For homes on wood, stucco masonry/cement composition panels, aluminum siding vinyl siding galvanized metal.	one coat application, self-priming, superior hiding flexible resists blistering and peeling.	1 hr touch 4 hr recoat

Sierra Performance (Rust-Oleum), S-16 Wall and Trim Enamel, WB Epoxy-Acrylic Semi-Gloss, 2	I	0	50	135-270	Properly primed doors, dry wall, concrete, wood, metal, tile	Excellent chemical, mildew and stain resistance, Exceptional durabiliby, fast drying, 18 hr pot life	30 min touch 1-2 hr recoat
Sierra Performance (Rust-Oleum), S38 Beyond Multi-Purpose Enamel WB Satin Acrylic Urethane	I/E	0	37	165-520	Doors, cabinets, trim, furniture, equipment, tanks	Excellent durability, non-blocking, mar resistant	2-4 hrs
Southern Diversified Products, 102 Line, American Pride, 100% Acrylic Semi-Gloss Enamel	I	5	37	400	For use in residential and commercial facilities on drywall, plaster, wallcovering, metal, wood and wood paneling.	Low VOC and odor, soap and water cleanup, anti-microbial, stain resistant, tough, durable, high bonding.	2 hr touch 4-8 hr recoat
Vista Paint, 6400 Earth Coat Acrylic Semi Gloss	I	16	39	350-400	Interior drywall, plaster, masonry, concrete, wood	Resistant to scuffing, staining and abrasion, excellent hide, touch up, superior adhesion	1 hr touch 6 hr recoat

N/A= Not Available

40

Nonflats (Low-Gloss ≤ 50 g/l)

Coating Company and Product Name	Interior Exterior	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal) @3mils	Recommended Substrate/Exposure	Coating Characteristics	Dry time to recoat
American Formulating and Manufacturing Safecoat Eggshell Zero VOC	I	0	N/A	350	Walls, ceilings, wallboard, properly cured and primed plaster, masonry and primed metal	Superior durable finish, odor free	1 hr touch 4 hr recoat
American Formulating and Manufacturing Safecoat All Purpose Satin	E	42	N/A	350	Walls, and trim made of wood, stucco, masonry, primed metal	Durable satin appearance, fast curing,weather resistant, superior film formation	1 hr touch 6 hr recoat
Benjamin Moore, 223 Pristine Eco Spec Acrylic Latex Eggshell Enamel	I	1	36	400-450	Wood, plaster, masonry, primed metal	Sheen of 8-16 units @ 60º, spatter resistant, scrubbable, high hiding, excellent touchup	2 hrs
California Paints, Fres-Coat Acrylic Eggshell 631XX	I	35	36	250-400	Plaster, sheetrock, wallboard, concrete, masonry block, wood, primed metal and galvanized metal, acoustical surfaces	Sheen 7 @ 60º, Superior durability, anti-spatter, dries quickly	2 hrs
Cloverdale Paint, 90753 Horizon Eggshell Latex	I	1	40	317-420	For schools, hospitals, nursing homes, offices and other smell-sensitive areas on drywall, wood, masonry, steel.	Ultra low VOC, low odor, washable finish.	30 min tackfree 2 hr recoat
Color Wheel Paints & Coatings, 5540 Hi-Hide Low VOC Latex (Satin)	I	1	37	300-500	Concrete, masonry, wood surfaces, gypsum wallboard, and primed ferrous metals, aluminum, galvanized metals	Sheen 15-30 @ 85º, high hiding, outstanding touch up, scrubbable, washable, non-yellowing	4 hrs
Columbia Paint & Coatings, Professional Pro-Choice Vinyl Acrylic Latex Satin 02-797	I	48	30	325	Primed wood, drywall, plaster, masonry, concrete, and metal	Sheen 2-3 @ 60º, excellent touch-up, dries rapidly	2-4 hrs
Columbia Paint & Coatings, Purecoat Low Odor Acrylic Eggshell 05-575	I	0	43	360	Primed wood, drywall, plaster, masonry, concrete, and metal	Sheen 14-22 @ 60º, very good flow and leveling, good hiding, excellent spatter resistance, excellent stain removal and adhesion	12-16 hrs
Coronado Paints, 1230-1 Air Care Odorless Acrylic Eggshell	I	0	39	450	Primed walls, woodwork, drywall, plaster, masonry,and metal	Sheen 20-25 @ 85º, flows easily, excellent hiding power, dries quickly, scrubbable	30 min touch 4 hr recoat
Dunn Edwards, W 540 Sierra Acrylic Eggshell Enamel	I	0	38	350-400	Primed drywall, masonry, wood, and metal	Excellent hide, good adhesion	1-2 hr touch 4-6 hr recoat
Dunn Edwards, W 5946 Latex Low Sheen	I/E	50	37	300-400	Primed drywall, masonry, wood, and metal	Durable, weather resistant, washable	1-2 hr touch 4 hr recoat
EPMAR, Kemiko Col-R-Tone III Acrylic Urethane	I/E	49	60	300-400	Floors, facades, steel, concrete storage tank exteriors, concrete bridges, pump equipment	Satin finish, resilient, non-yellowing	1 hr

Frazee Paint (PPI), 029 Envirokote Eggshell Finish, Acrylic Copolymer Resins	I	3	34	200-400	Interior walls, ceilings, trim on concrete/masonry, drywall, hard board, metal, plaster, wood	Sheen 28-35 @ 85º, resistant to abrasion, blocking washing, yellowing	2-4 hr touch 18 hr recoat
Fuhr International, 6100 ZVOC Acrylic Latex Paint, Flat and Eggshell	I	0	41	N/A	Interior surfaces	Great scrubability, fast dry, excellent durability and coverage, self priming, hypo allergenic formula	30 mins
General Paint (PPI), 54-030 HP3000 Eggshell Acrylic Finish	I	6	38	305-405	Interior applications in high wear areas such as schools, hospitals, care facilities, public areas and institutions	Excellent hiding power, incredible scrub resistance, sperior application properties, outstanding adhesion, fast dry, low odor	15-30 min touch 1 hr handle 2-4 hr recoat
General Paint (PPI), 59-030 Z-Coat Eggshell 100% Acrylic	I	5	38	305-405	Interior applications in high wear areas with high maintenance such as schools, hospitals, care facilities, public areas and institutions	Durable, fast-drying, washable	15-30 min touch 1 hr handle 2-4 hr recoat
Hallman Lindsay Quality Paints, 274 Comfort Kote Vinyl Acrylic Eggshell	I	3	41	350	Walls and ceilings made of drywall, plaster or masonry and wood surfaces	Sheen 12-15 units @ 60º, Excellent hiding and touch-up, good stain removal and washability	2 hr touch 4 hr recoat
Hallman Lindsay Quality Paints, 294 Pro Kote Latex Stain Enamel	I	28	36	400	For residential use on walls, ceiling and trim.	High-hiding, uniform satin finish, low-odor, scrubbable, soap and water clean-up.	1 hr touch 4 hr recoat
ICI Paints (Dulux), 1482-1200 Spraymaster Pro, Uni-Grip-WB Aquacrylic Dryfall Eggshell Primer & Finish	I/E	26	34	272-361	For ceilings and multiple overhead surfaces such as those in offices warehouse, stores, hotels, textile mills and industrial plants, suitable for galvanized decking.	Excellent adhesion, resists flash rusting, easy clean-up of overspray, low odor, good moisture resistance.	15 min touch 2 hr recoat
Innovative Formulations Company, Egg Shell, WB Acrylic Urethane	I/E	0	N/A	400-450	Drywall, plaster, concrete, most masonry surfaces, covers properly primed wood & metal	Sheen 8-15 @ 60º, one coat, fast dry, excellent weather-ability, durability, scrub resistance, strong adhesion	1 hr touch 2 hr recoat 24 hr hard dry
Innovative Formulations Company, Mold Not Egg Shell, WB Multi Shell Acrylic	I	0	N/A	400-450	Drywall, plaster, concrete, most masonry surfaces, covers properly primed wood & metal	Sheen 12-20 @ 60º, resistant to fungi, one coat, fast dry, strong adhesion, excellent weather-ability, durability, scrub resistance	1 hr touch 2 hr recoat 24 hr hard dry
Innovative Formulations Company, Satin, WB Acrylic Urethane	I/E	0	N/A	400-450	Drywall, plaster, concrete, most masonry surfaces, covers properly primed wood & metal	Sheen 12-20 @ 60º, one coat, fast dry, excellent weather-ability, durability, scrub resistance, strong adhesion	1 hr touch 2 hr recoat 24 hr hard dry
Kelly-Moore Paints, 1510 Enviro-Cote Acrylic Eggshell Enamel	I	0	40	350-450	Wallboard, plaster, masonry surfaces in schools, hospitals, offices, institutional facilities, residential and commercial facilities	Sheen 7-10 @ 60º, non-polluting, anti-microbial properties, USDA acceptable	1 hr touch 4 hr recoat
Miller Paint Company, #1450 Series Acro Satin	I	0	32	300-350	Hospital rooms, nursing homes, classrooms, kids rooms, bathroom, kitchens	Antimicrobial, non-yellowing, long term durability, excellent leveling and flow	½ hr touch 4 hr recoat
Miller Paint Company, #4650 Series Acro Eggshell	I	0	31	300-350	Hospital rooms, nursing homes, classrooms, kids rooms, bathroom, kitchens	Antimicrobial, non-yellowing, long term durability, excellent leveling and flow	1 hr touch 4 hr recoat
Morwear Manufacturing Inc, 180-01 Satin Acrylic Wall & Trim Enamel	I	12	44	300-400	Walls, trim, masonry, drywall, plaster, concrete, primed wood, primed metal, previously painted surfaces	Satin finish, superior hide, stain resistant, washable	½-1 hr touch 4 hr recoat
Pittsburgh Paints (PPG), 9-300 Series Pure Performance Eggshell, Acrylic Latex	I	0	38	350-400	For hotel/motel resort properties, nursing homes, homes, schools, government facilities, retail space, office buildings, hospitals and apartments on aluminum, concrete, drywall, ferrous metal, wood, galvanized steel, masonry, plaster, stucco	Zero VOC, minimal odor, excellent hiding power, washable, anti-microbial properties, low spatter, excellent touch-up properties	1 hr touch 4 hr recoat
Porter Paints (PPG), 489 Healthpro Eggshell Latex finish	I	0	35	200-400	Drywall, acoustical tile, plaster, primed metal, masonry, wallboard	Durable, high hiding, non-yellowing, low odor	2 hr touch 4 hr recoat
Rodda Paint Company, 523501 Horizon Satin	I	4	40	320	Walls and woodwork	Sheen 7-9 @ 60º, good resistance, low odor, enamel finish, non-toxic	½ hr touch 2 hr recoat
Sherwin Williams, 101.23 Harmony Styrenated Acrylic Latex Eg-Shel B9 Series	I	0	39	350-400	Drywall, masonry, concrete, cement, block, wood	Sheen 10-20 @ 85º, durable, anti-microbial	1 hr touch 4 hr recoat

Sherwin Williams, 101..67 Latex Matte A96-100 Series	I	41	41	350-400	For masonry, concrete, cement, block, drywall, plaster, wood, composition board	Resistant to stains, scuffs, burning, smooth even finish, anti-microbial	1 hr touch 4 hr rrecoat
Sierra Performance (Rust-Oleum), S-22 Wall and Trim Enamel, WB Epoxy-Acrylic Satin, 2	I	0	50	135-270	Properly primed doors, dry wall, concrete, wood, metal, tile	Excellent chemical, mildew and stain resistance, Exceptional durabiliby, fast drying, 18 hr pot life	30 min touch 1-2 hr recoat
United Coatings, Acryclad 100% Acrylic Emulsion Coating	I/E	50	36	300-400	Wood, hardboard siding, concrete, masonry, plaster, properly primed galvanized metal, aluminum, steel and existing painted surfaces	Excellent adhesion, extreme UV long term resistance, flexible	1 hr touch 24 hr cure
Vista Paint, 6200 Carefree Earth Coat Velva Sheen, 100% Acrylic	E	8	37	350-400	Recommended uses include properly primed drywall, concrete, masonry, wood and metal.	Low VOC, odor free, exceptional hide and touch-up with superior adhesion and exterior durability.	1 hr touch 6 hr recoat
Vista Paint, 6300 Earth Coat Acrylic Eggshell	I	15	42	350-400	Interior drywall, plaster, masonry, concrete	Resistant to scuffing, staining and abrasion, exceptional hide, touch-up with superior adhesion	45 min touch 6 hr recoat
Vista Paint, MB30 Aurora Bond II Acrylic	I/E	47	51	300-350	Wood, plywood, drywall, masonry	Good durability, fade resistant	4 hr recoat

N/A= Not Available

Primer, Sealer, Undercoater (≤ 100 g/l)

Coating Company, Product Name, Components	Interior Exterior	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Recommended Substrate/Exposure	Coating Characteristics	Dry Time
AllPro Corporation, 685 Ultra-Prep 100% Acrylic	I	43	N/A	500-600	Provides an ideal surface for wallcovering installations	Fast dry, superior hiding, extremely water resistant, seals chalky paint	1 hr recoat
American Formulating and Manufacturing MetalCoat Acrylic Metal Primer	I/E	93	N/A	300	Steel, galvanized iron and aluminum	Thermoplastic acrylic emulsion, rust inhibiting pegments, tough and flexible film, excellent adhesion, outstanding corrosion resistance	30 min touch 4 hr recoat
American Formulating and Manufacturing Safecoat Safe Seal, WB Acrylic	I	64	N/A	350	Porous surfaces such as processed wood products, concrete, wood, new drywall, grout and plaster	Highly effective at sealing in toxicity of underlying surface, low odor	1 hr touch 2 hr recoat
American Formulating and Manufacturing Safecoat Transitional Primer, WB Acrylic	I/E	22	N/A	300-350	Walls, ceilings, wood and wood trim, fully cured plaster, stucco, masonry and drywall	Well suited to transition from oil based painted surfaces to waterbased coatings, stain blocker for knot holes, water soluble stains and oils, tannins, and terpenes	1 hr touch 8 hr recoat
Anchor Paint, 1513 Zapit II Primer/Sealer/Stain Blocker, Acrylic Emulsion	I/E	97	43	690	General Sealer and adheres well over old varnish, lacquer, gloss finishes, hardboard	Effectively seals off bleeding of water stains, ink, pencil, smoke and wood tannins, good abrasion, flexibility and weather resistance	30 min touch 1 hr recoat
Andek, Polaseal EFM, WB Siloxane	E	0	N/A	100-200	Wood Surfaces	Water repellent, resists breakdown from UV, microbiological activity, pollutants and chemicals, breathable	2 week cure
Benjamin Moore, 216 Regal FirstCoat Latex Primer & Underbody	I	100	27	400-500	Wallboard, cured plaster, trim, galvanized metal, and masonry surfaces	Rapid drying, spatter resistant, excellent holdout and hiding qualities	1 hr touch 1 hr recoat
Benjamin Moore, 231 Pristine Eco Spec 100% Acrylic Latex Primer/Sealer	I	50	30	550	New or previously painted drywall, composition board, wood, concrete, plaster, and other porous surfaces	Spatter-resistant, exhibits excellent holdout properties	30 min touch 1 hr recoat

ChemMasters, Chemisil, WB Clear liquid Sodium Silicate Sealer/Hardner	I/E	0	N/A	200-600	For concrete surfaces, horizontal or vertical applications, floor slabs, formed and poured walls, curing agent for surfaces scheduled to receive subsequent treatments.	Seals, hardents and dustproofs in one operation, no odor, compatible with most adhesives, increases resistance to penetration of liquids and oils.	½ to 1 hr touch
ChemMasters, ColorCoat, 100% Acrylic	I/E	51	60	150-200	For vertical and overhead concrete masonry, brick or stucco, formed walls.	Excellent adhesion and weathering properties, superior moisture vapor transmission, protects agianst airborne dirt and pollutants, non-yellowing and fade resistant.	2-4 hr recoat
ChemMasters, Polyseal WB Acrylic	I/E	82	25	300-400	Use to seal and dustproof older interior or exterior concrete, enhance the color and provide uniform appearance of dry shake hardened floors.	High performance, non-yellowing, high-solids curing and sealing compound, protects concrete surfaces, seals out most dirt and stains and minimizes spalling due to freeze-thaw cycle exposure.	2 hr touch
Cloverdale Paint, 20100 Towerthon Plus Elastomeric Coating	E	75	50	54-67	For masonry, stucco, concrete, prepared vinyl and aluminum siding and properly primed metal and new wood surfaces.	Excellent elongation properties, even at low temperatures, for hairline or cracked surfaces. Dries to an attractive satin sheen.	18 hr touch 24 hr hard dry
Cloverdale Paint, 90700 Horizon Interior Drywall Sealer, Vinyl Acrylic Latex	I	1	27	216-288	For schools, hospitals, nursing homes, offices and other smell-sensitive areas on drywall, plaster, textured ceilings, wallboard, fiberboard, and hardboard.	Low odor, flat	30 min tackfree 2 hr recoat
Color Wheel Paints & Coatings, 430 Ti-Guard Vinyl Acrylic Sealer Flat	I	98	29	300-500	Wall board, plaster, masonry, stucco, wood, plywood, acoustical ceiling tiles	Outstanding resistance to blistering, cracking, chipping, peeling, excellent adhesion, rapid dry, good enamel holdout	1 hr touch 4 hr recoat
Color Wheel Paints & Coatings, 1250 Ti-Gard Latex Conditioner, Acrylic	I/E	75	20	300-500	Previously painted masonry, stucco, plaster, wood, ferrous metals, aluminum and galvanized metals	Remarkable resistance to blistering, cracking, chipping, peeling, excellent adhesion, low odor, rapid dry	1 hr touch 4 hr recoat
Columbia Paint & Coatings, 02-728 Prime Time Drywall Undercoater, Vinyl Acrylic Latex	I	21	29	360	For use as a base coat over prepared drywall and as a primer prior to texture application.	High hiding formulation minimizes textural and porosity differences between the drywall face paper and joint compounds, provides consistent holdout characteristics to allow the finish coat to develop consistent sheen and appearance.	½-1 hr touch 2-3 hr recoat
Columbia Paint & Coatings, 05-200 Masterpiece Acry-Prime Styrene Acrylic Latex	I/E	84	41	360	Previously painted rough and smooth siding, wood, hardboard, masonry, concrete, stucco, properly prepared galvanized metal, drywall	Stain blocker, reduces face checking	1 hr touch 1 hr recoat
Columbia Paint & Coatings, 05-574 Purecoat Low Odor Primer Vinyl Acrylic Latex	I	0	36	360	Drywall, plaster, masonry, and non-bleeding woods	Offers high hiding, excellent enamel holdout, minimizes variations in finish coats	1 hr touch 2-4 hr recoat
Columbia Paint & Coatings, 05-700 Hi-Performance Perma-Flex Bonding Primer/Sealer Styrene Acrylic Latex	I/E	6	27	400	previously painted rough and smooth siding, wood, hardboard, masonry, concrete, stucco, properly prepared galvanized metal, wallboard	Flexible bridging sealer for unsound surfaces, provides permeability and flexibility, excellent adhesion, quick drying, stain blocking	.5-1 hr touch 1-2 hr recoat
Coronado Paints, 1240-11 Air Care Odorless Acrylic Primer	I	0	34	450	Drywall, plaster, smooth masonry	flows easily, excellent hiding power	30 min touch 4 hr recoat
Coronado Paints, 147-10 Rust-Grip Penetrating Epoxy Sealer 2	I/E	12	98	600-800	Apply over old paint, tight rust, mill scale, used as a primer for non-ferrous metals including galvanized steel	penetrates rust, corrosion inhibitors, improves adhesive integrity of old coatings	24 hr touch 24 hr recoat 10 day cure
Diamond Vogel Paints, BU-1501, 1502 Series Sure Grip Acrylic Latex Primer	E	95	38	305-407	Wood, hardboard, aluminum, masonry	Outstanding adhesion, stain blocking	½-2 hr touch 2-4 hr recoat
Diamond Vogel Paints, DU-1508 Latex Undercoater	I	56	32	344-516	Bare Interior Wood Surfaces	Excellent hold out, sands easily, smooth leveling	½-1 hr touch 1-2 hr sand/recoat
Diamond Vogel Paints, DU-1520 Latex Primer/Surfacer	I	58	30	160-240	For sealing walls and ceilings	Excellent hold out	1 hr touch 3 hr recoat

Diamond Vogel Paints, MC Series, V-Cote 200 Acrylic Maintenance Primer/Finish	I/E	91	39	209-313	Bare or previously painted steel, galvanized metal, wood, aluminum, masonry	Outstanding adhesion, corrosion inhibitors, non-yellowing, excellent durability and fade resistance	½-2 hr touch 2-4 hr recoat
Dunn Edwards, W 101Vinylastic Pigmented Sealer W 2397 Production Latex Wall Sealer W 5827 High Hide PVA Sealer WB Acrylic Copolymer	I	60	29-36	250-400	New drywall and skim-coated drywall	Dries fast, excellent hiding, adhesion, and enamel holdout	½-1 hr touch 2-4 hr recoat
Dunn Edwards, W 102 Proseal Pigmented Sealer WB Acrylic Copolymer	I	55	30	250-300	Drywall	Dries fast, enamel holdout	1 hr touch 2-4 hr recoat
Dunn Edwards, W 500 Sierra Sealer/Undercoater WB Acrylic Copolymer	I	0	38	300-400	Drywall, masonry, wood, hardboard	Good hide, adhesion, & enamel holdout	1 hr touch 2-4 hr recoat
Dunn Edwards, W 600 Ecoshield Low-Odor Latex, Modified Copolymer	I	10	36	300-350	For residential, commercial office buildings, schools, hospitals, and other closed ventilated buildings on drywall, masonry, wood, synthetic wood, metal.	Very good hide, adhesion and enamel holdout.	30-60 min touch 2-4 hr recoat
Dunn Edwards, W 715 Ultra Grip Multi-Purpose Primer WB 100% Acrylic	I/E	45	39	400	Wood, fiberglass, anodized aluminum, some plastics	Outstanding stain blocking, excellent enamel holdout, great hide, adheres well to aged alkyds and waterborne enamels	1 hr touch 4-6 hr recoat
Dunn Edwards, W 2400 Latex Enamel Undercoater WB Acrylic Copolymer	I	80	38	400	wood, synthetic wood, hardboard	Good hide, adhesion & enamel hold out	1 hr touch 2-4 hr recoat
Dunn Edwards, W 6315 Flex-Prime, Flexible Crack-Resistant Primer	I/E	75	41	100-250	Designed to bridge hairline cracks in masonry surfaces resulting in a seal that is highly flexible and allows for movement in the substrate.	A quality masonry primer formulated to provide excellent flexibility and resistance to efflorescence and alkali.	30-60 min touch 2-4 hr recoat
Duron Paints & Wallcoverings, 08-124 Bond-N-Seal Acrylic Latex Primer	E	90	35	400	For exterior priming of uncoated and factory primed hardboard siding, composite and synthetic substrates, cured unpainted masonry.	Excellent adhesion to new and many repaint surfaces, dries fast, resists minor tannic acid bleed, peeling, blistering, mildew.	1 hr touch 4 hr recoat
Duron Paints & Wallcoverings, 08-129 Siding in a Can Acrylic Primer	E	94	35	400	Primer for factory finished steel, aluminum and vinyl siding, hardboard and composite siding, plywood, masonry, galvanized metal	Resists peeling, blistering mildew, tannic acid bleed, excellent adhesion, dries fast	1 hr touch 4 hr recoat
Duron Paints & Wallcoverings, 71-218 Terminator 2 WB Stain Killer, Acrylic	I/E	13	36	350	Drywall, aluminum siding, galvanized metal, fiberglass, glossy paint, wood, poured masonry, vinyl siding	Seals porous surfaces, prevents stains, outstanding adhesion for glossy paints	20-30 min touch 1 hr recoat
EPMAR, Kemiko Clear WB Acrylic Urethane Sealer	I/E	0	30	300-400	Clear sealer on bare cement/plaster, wood and other composite surfaces	UV, abrasion and stain resistant, excellent leveling and flow properties	30 min touch 1 hr recoat
EVR-Gard Coatings, 63 Unikote Latex Enamel Undercoat	I/E	97	37	300-400	Wood, masonite, drywall	Extremely tough, good enamel holdout and adhesion, maximum hiding power	1 hr touch 4 hr recoat
EVR-Gard Coatings, 103 Evrcare Primer Sealer, Vinyl-Acrylic	I/E	0	32	350-400	Properly prepared or previously painted wall-board, wood, metal and masonry	Excellent hiding power	1 hr touch 4-6 hr recoat
EVR-Gard Coatings, 64 Quick Dry Latex Enamel Undercoat	I	61	40	300-350	Nearly all interior surfaces	Good adhesion	1 hr touch 2 hr recoat
EVR-Gard Coatings, 95 Busan Vinyl Acrylic Wood & Metal Primer	I/E	76	38	300-400	Wood, masonry, non-ferrous metals	Retards bleed through of tannins and resins in redwood, cedar and fir	1 hr touch 4-5 hr recoat
Farwest, X-6785 Aquashield II Fast Dry Red Oxide Waterborne Shop Primer	I/E	76	38	300-400	Metal Surfaces	Water and corrosion resistant film	30-45 min touch 1-3 hr recoat

Farwest, #5030 Block Filler Acrylic Latex Emulsion	I/E	25	27	100-150	Cement walls, cinder block	Heavy viscosity pigmented emulsion to fill pinholes on wall surfaces to withstand moisture and water leaks	1 hr touch 18 hr recoat
Farwest, #5085 Latex Acrylic Primer	E	46	33	200-400	Exterior wood and masonry surfaces	Good blocking resistance, adheres well to wood and masonry, fast dry, breathable film	1 hr touch 2-4 hr recoat
Farwest, #700 Wonderblok Stain Blocker Fast-Dry Acrylic Primer Sealer	I/E	82	41	300-400	Wallboard, ceramic tile, hardboard, plastic laminate, metal surfaces	Blocks out water, stains, smoke stains, felt tip pen, crayons, breathable film	30-40 min touch 2 hr recoat
Farwest, #970 Poroseal PVA Primer Sealer Pigmented Flat Latex Emulsion	I	27	31	300-500	Wallboard, cement block, plaster or brick surfaces	Good emulsion	30 min touch 1-3 hr recoat
Farwest, X-6791 Aquashield II, Waterborne Rust- Inhibitive Primer	E	76	38	300-400	Metal Surfaces	Fast drying, water and corrosion resistant film	30-45 min touch 1-3 hr recoat
Fine Paints of Europe, Eurolux Acrylic Primer/Undercoat	I	100	N/A	424	Walls, ceilings, and woodwork	Flows easily and spreads quickly	1 hr touch 4 hr recoat
Flex Bon Paints, 107 Series, Premium Acrylic Primer	I	75	29	450	Drywall, plaster, concrete, masonry, and stucco. May be applied to wood	Alkali resistant, good adhesion, good hold-out of sheen finishes	½-2 hr touch 4-6 hr recoat
Flex Bon Paints, 194 Series, Premium Acrylic Primer	I/E	70	39	400	Concrete, masonry, stucco, wood, steel, galvanized metal, aluminum, asbestos siding, plaster or hardcoat	Alkali resistant, good stain blocking, flash rust resistant	2-4 hr touch 18 hr recoat
Frazee Paint (PPI), 065 Acry-Prime Acrylic Undercoater	I/E	86	37	200-400	Concrete, masonry, wood, hardboard, non-ferrous metals, plaster, drywall	Excellent quality, fast drying, high hiding	30-60 min touch 3-4 hr recoat
Frazee Paint (PPI), 066 Envirokote Acrylic Copolymer Primer	I	4	42	100-400	Concrete, masonry, drywall, plaster, hardboard, metal, wood	Top of the line quality	1 hr touch 2-3 hr recoat
Frazee Paint (PPI), 168 Prime Plus Acrylic Primer Sealer Stain Killer	I/E	60	45	200-400	Concrete/masonry, drywall, plaster, metal, wood	Resists alkali on concrete and masonry, not for use on floors	1 hr touch 2-3 hr recoat 7 day cure
Frazee Paint (PPI), 172 Grip-N-Seal Acrylic All Purpose Primer	I/E	96-98	33	100-350	Concrete/masonry, drywall, plaster, metal, wood	Excellent adhesion, blocks stains and tannin bleed	1 hr touch 2-3 hr recoat 7 day cure
Frazee Paint (PPI), 266 Epotilt Epoxy-Acrylic Sealer	E	80	40	100-350	Block, concrete	Exceptional adhesion, resists alkali	4-8 hr touch 12 hr recoat
Fuhr International, 5400 ZVOC Wax Seal & Finish	I/E	0	32	350-450	Wood Substrates	Fast dry, excellent durability, early block resistance, anti-sag formulation, self-sealing	5 min touch 20 min sand
General Paint (PPI), 60-200 X-Terminator 2, Acrylic	I/E	60	N/A		Drywall, plaster, hardboard, wood, previously painted interior walls and ceiling	Prevents bleedthrough of smoke, water, grease, lipstick, crayon, felt marker and graffiti stains, excellent adhesion	40 min touch 60 min handle 2 hr recoat
General Paint (PPI), 70-002 Latex Primer	E	76	44	350-470	New or previously painted wood	Unique penetrating properties, contains stain blocking pigments and fungicidal agent	15-30 min touch 2 hr handle 4 hr recoat
Glitsa American Inc, 27-0043 Infinity Color Control Sealer	I	85	N/A	500	Wood Floors	Fast drying, acrylic resin	1-3 hr recoat
Hallman Lindsay Quality Paints, 112 Primeguard, Alkyd-Modified Acrylic Primer	E	30	35	400	New and previously painted surfaces such as wood, hardboard siding, plaster, stucco and masonry	Excellent sealing and adhesion properties, flexible and outstanding lister and mildew resistance	1 hr touch 6-8 hr recoat
Hallman Lindsay Quality Paints, 526 Stainguard 100% Acrylic	I/E	80	36	400	Wood, plaster, drywall, hardboard, masonry, fire-damaged walls, ceiling, and trim, acoustical ceiling tiles, new and previously painted surfaces	Resists tannin and nail head staining on woods such as cedar and redwood. Seals in stains such as marker, crayon, lipstick, graffiti, water stains, smoke and burned or charred surfaces	30-40 min touch 1 hr recoat
ICI Paints (Devoe), DRH6400 Hydroprime WB Acrylic Penetrating Sealer	I/E	58	30	250-400	To seal and prepare new and old concrete, stucco, precast concrete or previously painted wood, concrete or metal surfaces	Excellent penetration, strengthens masonry surfaces, promotes adhesion	1 hr touch 4 hr recoat

Ideal Paints (PPI), 2070 Acrylic Stain Blocking Primer	E	72	35	400	Wood, masonry, galvanized metal	Stain blocking, Excellent adhesion to glossy and galvanized surfaces, flash rust resistant	1 hr touch 10 hr cure
Ideal Paints (PPI), 7500 Vinyl Acrylic Latex Primer/Sealer	I	38	N/A	450	Drywall, cured plaster	Good hiding, excellent enamel holdout, fast dry, low odor	30 min touch 2-4 hr hard dry
Kelly-Moore Paints, 95-25 Pre-Cote Wallboard Primer/Sealer Vinyl Acrylic	I	78	33	200-300	Wallboard and plaster for commercial or residential application	Minimizes joint banding, excellent for critical light areas, equalizes surface porosity	1 hr touch 4 hr recoat
Kelly-Moore Paints, 971 Acry-Plex Interior PVA Primer/Sealer Low Odor Formula, Vinyl Acrylic	I	20	35	250-350	For wallboard, concrete, and cured plaster. Particularly suited as a first coat on smooth wallboard to equalize porosity and develop a uniform surface. Excellent for commercial and residential application.	Excellent enamel holdout, uniforms surface, high hide, easy application, fast drying, minimal odor and VOC, easy soap and water cleanup.	1 hr touch 4 hr recoat
Kelly-Moore Paints, 1505 Enviro-Cote PVA Primer/Sealer, Vinyl Acrylic	I	13	50	250-350	Wallboard, concrete, and cured plaster for residential or commercial application	Equalizes porosity , develps a uniform surface, excellent enamel holdout, high hide, fast drying	1 hr touch 4 hr recoat
KST Coatings, LLC (Thoro), Prime A Deck, Acrylic Latex	E	46	N/A	100	Roof, walls and decks made from wood, concrete, metal, asphalt, fiberglass, aged tar, rolled roofing masonry, stucco, gutters	Waterproofs and protects, mildew and algae resistant, exceptionally strong and elastomeric, superior adhesion to almost any surface, cures to form a high strength seamless membrane, durable over wide range of temperatures, withstands ponding	N/A
Kwal Paint (PPI), 0830 Environkote Latex Primer/Sealer	I	50	46	250-400	Drywall, plaster, concrete, insulation, previously painted or primed metal	Fast drying, alkali resistant, may be topcoated with most conventional latex or alkyd based products	1 hr dust free 4 hr recoat
Kwal Paint (PPI), 0875 FDC Drywall Primer, Vinyl Acrylic Emulsion	I	33	33	350	New drywall and woodwork	Formulated for use under either alkyd or latex products, excellent sanding and sealer properties,	1 hr dust free 4 hr may be sanded
Kwal Paint (PPI), 890 Sandable Drywall Primer, Vinyl Acrylic Emulsion	I	34	30	350-400	Specifically formulated for use under eggshell, satin, semi-gloss, or gloss paints.	Excellent sanding and sealing. Ideal product for prepping and sealing smooth finished drywall work.	1 hr dust free 4 hr recoat
Kwal Paint (PPI), 5860 All Purpose Primer/Undercoat, 100% Acrylic Emulsion	I/E	82	43	250-350	Wood, concrete, plastic, hardboard, drywall and cement	Alkali Resistant, breathable, flexible, fast drying, excellent adhesion to properly prepared surfaces	1 hr dust free 4 hr recoat
Kwal Paint (PPI), 5862 Cancel Sand Acrylic Primer	I/E	54	43	250-350	Specially formulated to sand quickly.	A water reducible, alkali resistant, fast-drying primer. May be topcoated with most finishes, water or solvent-reduced.	1 hr dust free 4 hr recoat
Manufacturing & Consulting Chemists Inc, M-3XXX Series Pigmented Concrete and Masonary Acrylic Sealer	I/E	50	32	300	Concrete and masonry including blocks, bricks, and tiles	Excellent clarity, fast dry	30 min touch 1 hr recoat
Martin Senour, 30-1185 T.P.S. Latex	I	89	29	400	Walls and ceilings made from drywall, wallboard, masonry	Seals to provide a non-porous surface, sands smoothly, can be used under latex, oil, or alkyd paints	1 hr touch 3-4 hr recoat
Martin Senour, 71-1001 Pro Line Premium Latex	I	67	28	400	Walls and ceilings made from drywall, wallboard, masonry	Seals porous surfaces promoting topcoat adhesion, resists raising paper fibers, good for spot priming and covering dark colored surfaces, sands smoothly	1 hr touch 3-4 hr recoat
Miller Paint Company, #1545 Moisture Vapor Barrier Primer	I	56	33	250-300	Wallboard and plaster surfaces	Moisture vapor barrier preventing moisture migration into wall insulation	1 hr touch 3 hr recoat
Minuteman Intl. (Multi-Clean), Court Shield First Round	I	23	26	600-800	Wood Floors	Helps prevent side bonding on tongue and groove flooring, penetrates, non-yellowing, dries quickly	2 hr recoat
Morwear Manufacturing Inc, 1877 PVA Acrylic High Build Primer	I	100	26	250-350	Plaster, concrete, brick, acoustical tile and all types of drywall	Extra hide, quick drying, excellent enamel holdout	½-1 hr touch 4 hr recoat

Morwear Manufacturing Inc, 2099 Acrylic Multi-Surface Primer	E	98	31	300-400	Stucco, tilt-up, poured concrete, brick, concrete block, galvanized metal	Excellent adhesion, alkali resistant, good tannin stain blocking, very good enamel holdout	30 min touch 4 hr recoat
Para Paints, Prime Tech Hi-Hide Latex Primer 5799	I	87	N/A	400-450	For drywall, dry plaster or previously painted porous surfaces. Can be used as an undercoater on wood trim such as base boards and doors	A high hiding sealer	30 min touch 4-6 hr recoat
Parker Paint CGI, Galv O Prime 1821 Acrylic Galvanized Primer	I/E	75	45	490	Typical uses include galvanized iron and aluminum. Designed for use with waterborne finish coatings,.	100% acrylic primer that is composed of anti corrosive pigments and acrylic resins, provides excellent coverage, durable, adhesive and self-etching properties that resists cracking.	2 hr tack free 24 hr recoat
Parker Paint CGI, Pro Seal 9125 PVA Acrylic Primer	I	34	30	350	Superior for use on recycled paper faced wallboard, plaster or concrete. Use on walls and ceilings where a smooth sand finish or textured wallboard finish is required.	A quality highly pigmented primer sealer. Can be applied before or after texturing is applied.	1 hr tack free 4 hr recoat
Parker Paint CGI, Epo Tilt 9145 Alkali Resistant Cementitious Primer, Epoxy Modified Acrylic	I/E	80	40	300	For priming new and previously painted above grade concrete and masonry surfaces.	Alkali resistant cementitious primer.	6 hr touch 12 hr recoat
Pittsburgh Paints (PPG), 6-2 Speedhide Interior Latex Sealer Quick-Drying	I	98	28	350-450	Can be used as a primer under finish coats of oil, alkyd or latex paints, ideal under eggshell and semi-gloss finishes. Recommended for use on properly prepared wallboard, sheetrock, fabric-surfaced pipe covers, wood, primed metal, brick and cured plaster, masonry and concrete surfaces.	Excellent adhesion and sealing properties, easy application, fast drying, soap and water clean-up.	10 min touch 4 hr recoat
Pratt & Lambert Paints, Z1002 / F1002 Supreme Latex Wood Primer	E	100	30	400	Designed for use on exterior wood and plywood siding and trim.	Enhances the durability of topcoats and offers superior adhesion to wood, exceptional tannin stain resistance and spatter less.	30 min touch 4 hr recoat
Pratt & Lambert Paints, Z8160 / F8160 Pro-Hide Gold Latex Wall Primer	I	100	28	400	Formulated to promote peak performance of latex or alkyd wall paints. Recommended for interior drywall, plaster, masonry, canvas and other porous, spackled or patched surfaces.	Fast drying and provides excellent hiding, holdout and spatterless application.	30 min touch 4 hr recoat
Rodda Paint Company, 32542 Roseal/507701 Roseal, Heavy Body Pigmented Vinyl Acrylic	I	44-87	28	300-325	Primer under oil type, emulsion paints	Very fast drying, non-toxic,	½ hr touch 2-3 hr recoat
Rodda Paint Company, 503501 Horizon Primer,	I	6	27	230	Wall primer	Moderate resistance, non-toxic, self priming	½ hr touch 2-3 hr recoat
Rodda Paint Company, 505901 Multi Prime 100% Acrylic Primer	I/E	19	38	300	New, unpainted, concrete, stucco, masonry, drywall, or hardboard	Resistance good, non-toxic	1 hr touch 3 hr recoat
Rodda Paint Company, 507801Scotseal, Heavy Body Pigmented Vinyl Acrylic/Acrylic Forified Latex	I	87	39	330	Primer under alkyd or emulsion finishes on drywall	Excellent hold-out, non-toxic	½ hr touch 2-3 hr recoat
Roman Decorating Products, PRO-977 Ultra-Prime, Acrylic Primer	I	50	37	550	Excellent for priming bare drywall, can be tinted	Replacement for oil/alkyd based primers	1 hr recoat
Seal-Krete Inc, Seal-Krete Driveway Protector, Siliconate	I/E	0	5	200-300	Horizontal concrete surfaces such as driveways, sidewalks, porches and patios	Keeps water from penetrating, protects against spalling, pockmarking and road salts, maximum durability	15-60 min touch no recoat
Sherwin Williams, 108.01 PrepRite 200 Vinyl Acrylic Latex B28W200	I	86	28	400	Drywall, masonry, concrete, previously painted surfaces	Excellent coverage, excellent drywall sealer	1 hr touch 4 hr recoat
Sherwin Williams, 108.02 PrepRite 400 Vinyl Acrylic Latex B28W400	I	61	29	350-400	Drywall, masonry, concrete, previously painted surfaces	Good drywall sealer	1 hr touch 4 hr recoat

Sherwin Williams, 108.04 PrepRite ProBlock Acrylic Latex Primer Sealer B51 Series	I/E	73	36	400	Use on interior drywall, ceiling tiles, PVC piping, cured plaster, paneling and wall laminate. Use on int/ext galvanized metal, wood, aluminum, hardboard, previously painted surfaces.	Assures uniform appearance of topcoats, fast dry, use on interior or exterior.	30 min touch 1 hr recoat/primer 4 hr recoat/sealer
Sherwin Williams, 108.08 PrepRite High Build Vinyl Acrylic Latex B28W601	I	71	23	400	Drywall, cured plaster, under decorative texture finishes	Ensures coat will be smooth, minimizes minor surface imperfections	1 hr touch 4 hr recoat
Sherwin Williams, 108.10 A-100 Acrylic Latex Primer	E	89	36	350-400	Wood, plywood, cement, stucco, composition board, cement composition panels, spot primer	Mildew Resistant, low temperature	1-2 hr touch 4-48 hr recoat
Sherwin Williams, 108.15 Harmony Latex Primer B11W900	I	0	33	350-400	Drywall, masonry, concrete, cement block, plaster	Anti-microbial, very low odor, formulated without silica	1 hr touch 4 hr recoat
Sherwin Williams, 108.16 Color-Prime Vinyl Acrylic Latex Deep Tinting Base	I	95	26	350-400	Drywall, masonry, concrete, cured plaster, previously painted surfaces	Excellent hiding primer, excellent coverage, excellent drywall sealer	1 hr touch 4 hr recoat
Sherwin Williams, 108.17 Moisture Vapor Barrier B72W1, Vinyl Acrylic/Styrene Butadiene	I	32	N/A	200-250	drywall	Reduces loss of moisture	1 hr touch 4 hr recoat
Sherwin Williams, 108.21 PrepRite Bonding Primer B51W50, Acrylic Adhesion Promoting Primer	I/E	41	42	350-400	Aluminum, copper, drywall, tile, glass, concrete, masonry, fiberglass, plastic, PVC, procelain	Excellent adhesion, does not contain rust inhibitors	40 min touch 4 hr recoat
Superior Environmental Products, SC-2100 NovoFloor	I	0	100	160	Shop, garage, semiconductor, or warehouse floor	Excellent Chemical and heat resitance, excellent wear resistance	1-5 hr recoat 7 day cure
Tamms Industries, Clearseal WB 150 Acrylic (Low Sheen) Clearseal WB STD Acrylic (Med. Sheen) Clearseal WB 300 Acylic (Gloss)	I/E	<50	N/A	150-400	Formulated for extended wear. Used on horizontal concrete and masonry surfaces. Typical uses include driveways, patios, garages, warehouses, and commercial buildings. Ideal for indoor applications in offices, hospitals and schools.	Low viscosity, penetrating cure, sealer and hardener. Water based concrete cure and seal, one compenent.	2-4 hr recoat
Van Technologies, Inc 200WP-Van Aqua WB White Primer	I/E	74	N/A	N/A	Wood, works with a wide variety of topcoats including solvent based	Minimizes grain raise, dries fast, spray, brush or roller application	10-15 min dry
Van Technologies, Inc 244BLK-Van Aqua WB Black Primer/Sealer	I/E	16	N/A	N/A	Wood, works with a wide variety of topcoats including solvent based	Minimizes grain raise, dries fast, spray, brush or roller application	15-30 min dry
Van Technologies, Inc 640-VanEx Clear WB Sealer	I/E	49	N/A	N/A	All wood surface applications, compatilbe with most topcoat applications	Minimizes grain raise, dries fast, based on exterior grade acrylic polymers and use of UV absorbers, contains fungicide/mildewcide	15-30 min dry
Vista Paint, 190 Uniprep, WB Vinyl Acrylic	I	35	28	400-450	New drywall and plaster	Fills and levels uneven new drywall	1 hr touch 2 hr recoat
Vista Paint, 4000 Uniprime 100% Acrylic	I/E	50	41	350-375	New concrete, masonry, wood, galvanized metal and aluminum	Excellent resistance to efflorescence and alkalinity	1 hr touch 2-4 hr recoat
Vista Paint, 4200 Terminator II Acrylic Epoxy-Ester	I/E	50	42	300-375	Wood, drywall and acoustical ceilings	Excellent for blocking water stains, crayons, markers, holds back tannic acid bleeding	2-4 hr touch 24 hr recoat
Vista Paint, 6000 Earth Coat Acrylic Primer	I	18	39	350-500	New concrete, plaster, masonry, drywall and wood	Superior adhesion, excellent base	45 min touch 6 hr recoat

N/A= Not Available

Quick-Dry Primer, Sealer, Undercoater (≤ 100 g/l)
(Numerous coatings listed in Primer, Sealer, Undercoater meet the dry time and gloss requirements of a Quick-Dry PSU)

Rule 1113 Future Compliant Coatings
2004-2005 Technology Assessment
December 2005

Coating Company and Product Name	Interior Exterior	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal) @3mils	Recommended Substrate/Exposure	Coating Characteristics	Dry Time
Cloverdale Paint, 70329 Ecologic Rustex WB Primer	I/E	99	40	641	General purpose direct-to-metal primer for properly prepared ferrous and non-ferrous metals at industrial, commercial and/or institutional applications	Good corrosion resistance, re-coat tolerant, adhesion to wide range of substrates	15 min touch 2 hr recoat
Cloverdale Paint, 70700 Zero VOC Latex Drywall Sealer	I	0	30	190-310	Drywall at schools, institutions, hospitals, hotels, offices	Good hiding, sealing and sandability properties, may be used under any architectural coating	30 min touch 2 hr recoat
Cloverdale Paint, 90700 Horizon Interior Drywall Sealer, Vinyl Acrylic Latex	I	1	27	216-288	For schools, hospitals, nursing homes, offices and other smell-sensitive areas on drywall, plaster, textured ceilings, wallboard, fiberboard, and hardboard.	Low odor, flat	30 min tackfree 2 hr recoat
Color Wheel Paints & Coatings, 8300 Gloss Prep WB Undercoat	I	73	37	300-500	Wall board, plaster, masonry, stucco, wood, plywood, acoustical ceiling tiles	Excellent enamel holdout, excellent adhesion, very good hiding, fast drying	30 min touch 1 hr recoat
Columbia Paint & Coatings, 05-208-PP Premium Pro Pro-Shield II WB Styrene Acrylic Latex	I/E	70	41	325	New or previously painted rough and smooth siding, wood, plywood, aluminum and vinyl siding, hardboard, masonry, concrete, stucco, iron and steel, galvanized metal	Stain blocker, permeable and flexible film, reduces face checking	30 min touch 1 hr recoat
Columbia Paint & Coatings, 05-210 Hi-Performance Fast Dry Molding Primer Vinyl Acrylic Latex	I/E	56	40	320	For job site spray application over new interior wood	Highly abrasion resistant, excellent block resistance, high degree of hold-out	5-10 min touch 1 hr recoat
Davis Paint Company, 0780 Da-Luxe Universal First Coat Primer, Acrylic/Alkyd	I/E	101	42	400	Iron, steel, galvanized metal, wood, masonry, drywall	Durable, can block out smoke damage,	30 min touch 2 hr recoat
Davis Paint Company, 0790 Acrylic Stain Block	I/E	71	42	400	All ferrous and non-ferrous metals, wood and wood by-products, masonry, drywall	Durable, sandable, can be used to block smoke damage and stains	30 min touch 2 hr recoat
Davis Paint Company, 2475 Hold-Tite Acrylic Latex House Paint Primer	E	89	33	400	Both new and previously painted wood	Durable, quick dry, outstanding blister resistance, nilew resistance and color retension	30 min touch 2 hr recoat
ICI Paints (Color Your World), 8791 Acrylic Blokker Primer	I/E	97	49	200	Wood, plaster, drywall, concrete, stucco, masonry	Stain blocker including smoke, graffiti, crayon, lipstick and grease, excellent adhesion to glossy surfaces,	30 min touch 2 hr recoat
ICI Paints (Devoe) 4020PF DEVFLEX WB Acrylic Direct-to-Metal Primer & Flat Finish (1000 White/7100 Red)	I/E	76-80	44	275-350	Exterior of tanks, metal buildings, structural steel, piping, handrails, masonry construction	Direct-to-metal or masonry primer, low odor, resists flash rust, corrosion resistance, fast dry	30 min touch 2 hr recoat
ICI Paints (Devoe), 8502 White/8520 Red Oxide Mirrolac-WB Acrylic Direct-To-Metal Flat Primer and Finish	I/E	77	44	275-350	For exterior tanks, metal buildings, structural steel, piping, handrails and masonry construction, steel, weathered or properly cleaned galvanized steel and masonry in institutional, residential and light industrial areas.	Non-flammable, fast dry and recoat, resists flash rust, corrosion resistance, hard durable film.	30 min touch 2 hr recoat
ICI Paints (Dulux), 1030-1200 Prep & Prime PVA Wall, WB Vinyl Acrylic Primer	I/E	100	26	400	Drywall, concrete block, brick	Fast drying, high hiding	30 min touch 2 hr recoat
ICI Paints (Dulux), 2000-1200 Prep & Prime House, 100% Acrylic WB Primer Sealer	E	95	50	300-500	Wood, concrete, masonry, non-ferrous metal	Fast drying, resistant to blistering, cracking and peeling, excellent adhesion and hide, mildew resistant, moisture and alkali resistant	30 min touch 1 hr recoat

ICI Paints (Dulux), 1482-1200 Spraymaster Pro, Uni-Grip-WB Aquacrylic Dryfall Eggshell Primer & Finish	I/E	26	34	272-361	For ceilings and multiple overhead surfaces such as those in offices warehouse, stores, hotels, textile mills and industrial plants, suitable for galvanized decking.	Excellent adhesion, resists flash rusting, easy clean-up of overspray, low odor, good moisture resistance.	15 min touch 2 hr recoat
ICI Paints (Dulux), 1486-1200 Spraymaster Pro, Uni-Grip-WB Aquacrylic Dryfall Semi-Gloss Primer & Finish	I/E	39	40	350-450	For ceilings and multiple overhead surfaces such as those in offices warehouse, stores, hotels, textile mills and industrial plants, suitable for galvanized decking.	Excellent adhesion, resists flash rusting, easy clean-up of overspray, low odor, good moisture resistance.	15 min touch 2 hr recoat
ICI Paints (Glidden), GL3210 Ultra-Hide Aquacrylic Gripper Stain Killer Primer-Sealer	I/E	95	50	300-450	Drywall, wood, cured plaster, masonry galvanized metal, aluminum	Blocks stains such as water stains, lipstick, smoke, ink, crayons, and tannin stains, high hiding, excellent sealing, excellent adhesion & hide, quick drying, moisture and alkali resistant	30 min touch 1 hr recoat
International Protective Coatings, Intercryl 520 Waterborne Acrylic	E	43	44	353	Properly prepared metal, concrete, wood at offshore structures, bridges, refineries, petrochemical and chemical plants	Rust inhibitive	30 min touch 1 hr hard dry
Kwal Paint (PPI), 5193 Accu-Pro Clear Acrylic Sealer	I/E	84	29	200-350	Verticle/horizontal masonry, brick, cinder block, stucco, patios, steps, and porches	Maximizes topcoat adhesion, promotes uniformity of topcoat sheen, protects topcoat from alkalinity and efflorescence, helps to prevent penetration of moisture	30 min touch 1 hr recoat 24 hr cure
Morwear Manufacturing Inc, 4077 Quick Grip Quick Dry Enamel Undercoater	I/E	63	40	200-400	Plaster, walls, drywall, concrete, brick, hardboard, wood	Quick drying, excellent adhesion, sandable, good enamel holdout	30 min touch 2 hr recoat
Pittsburgh Paints (PPG), 4-603 Perma-Crete, 100% Acrylic Latex	I/E	99	37	400-500	For wood, plaster, wallboard, and masonry surfaces such as poured and pre-cast concrete and cinder block, tilt-up and stucco surfaces.	Excellent stain blocker, prevents burning action of hot alkali, apply to surfaces up to pH 13, outstanding adhesion and sealing properties.	30 min touch 1 hr recoat
Pittsburgh Paints (PPG), 17-21 Seal Grip Acrylic Latex Stain Blocker	I/E	96	38	400-500	Aluminum, masonry, stucco, wood, galvanized metal, plaster, wallboard	Exceptional adhesion, block stains such as water, smoke, ink, markers and tannins, quick-dry, low temperature application	30 min touch 1 hr recoat 4 hr cure
Pittsburgh Paints (PPG), 17-921 Seal Grip, 100% Acrylic Universal Primer/Sealer	I/E	96	38	400-500	For residential and commercial markets on aluminum, brick, cement, galvanized metal masonry plaster, stucco, wallboard, wood.	Blocks most stains - water, smoke, ink, markers, and tannin, super adhesion, fast dry, low odor.	30 min touch 1 hr recoat 4 hr cure
Porter Paints (PPG), 184 STA-KIL WB 100% Acrylic Stain Blocker	I/E	96	38	200-400	Wood, Tile, hardie board siding, aged alkyd, concrete, masonry, stucco, drywall, galvanized metal	Blocks stains such as water, smoke, ink, graffiti and wood tannins. Fast drying, exceptional adhesion	30 min touch 1 hr recoat
Resene Paints Limited, D45 Quick Dry Acrylic Primer Undercoater	I/E	64	N/A	135	Block, brick, cement plaster, wallboards, timber, wallpaper, repaint	Good chemical and solvent resistance, excellent durability, excellent adhesion, excellent flow & sanding properties	20 min touch 2-4 hr recoat
Sampson Coatings, 22305 Latex Stain Blocker	I/E	70	46	736	Painted drywall, wood, plaster, and bleeding-type pigmented bulletin colors and sign paints	Highly resistant to stain bleed due to smoke and fire damage, water, sap, knots, ink, markers, lipstick and grease	30 min touch 1 hr recoat
Sherwin Williams, 108.04 PrepRite ProBlock Acrylic Latex Primer/Sealer B51 Series	I/E	99	36	400	Drywall, ceiling tiles, PVC piping, cured plaster, paneling, wall laminate, galvanized metal, wood, aluminum, hardboard	Fast drying, good adhesion to slick, glossy surfaces, seals out solvent sensitive stains, minor dried water stains	30 min touch 1-4 hr recoat
Sherwin Williams, 108.07 PrepRite Classic Acrylic Latex Primer B28W101	I	90	40	400	Drywall, cured plaster, textured walls, aluminum, wood, pre primed metal, galvanized metal	Quick drying, fast sanding, excellent coverage, quality sealer under wallcovering	30 min touch 2 hr sand/recoat
Sierra Performance (Rust-Oleum), Griptec Multi-Surface Sandable Primer WB Acrylic	I/E	0	40	180-545	Concrete, masonry, metal, galvanized steel, plastic, wallboard, wood, plaster, stucco, and previously painted surfaces	Fast drying, excellent hiding power and adhesion	30 min touch 1-2 hr recoat

Sierra Performance (Rust-Oleum), S-70 Brushing Metal Primer and S-71 Spray Metal WB Epoxy Primer, 2	I/E	0	43	200-320	Equipment and other steel surfaces in moderate industrial environments	Excellent adhesion, Fast dry, corrosion resistant, 6 hr pot life	30 min touch 1-2 hr recoat
Vista Paint, XP11A Aqualac Industrial Wood Pigmented Undercoater	I	70	40	300-500	Wood	Fast drying, sandable	30 min touch 1 hr recoat
Zehrung (Zinsser/RPM), Z-Prime II, Acrylic Polymer	I/E	5	54	250-450	For use in hospitals, nursing homes, schools, office buildings, hotels on wood, painted or varnished surfaces, drywall, plaster, hardboard, vinyl, aluminum or clean galvanized metal	Super-fast dry, adheres to problem surfaces, sands readily within one hour, blocks most stains, low odor, non-blocking	30-45 min touch 1 hr sand 1 hr topcoat
Zinsser, 2500 Series Shieldz Universal Pre-wallcovering Pigmented Acrylic Latex Primer	I	100	31	400-550	New or previously painted drywall, cured plaster, wood paneling, ceramic tile; glass formica, existing non-porous wallcoverings such as vinyl	Excellent adhesion to all paintable surfaces, high hiding	30 min touch 2 hr recoat

N/A= Not Available

Rust Preventative Coatings (≤ 100 g/l)

Coating Company and Product Name	Interior Exterior	VOC content (gm/l)	Solids (% by volume)	Coverage	Recommended Substrate/Exposure	Coating Characteristics	Drying time to recoat
American Formulating and Manufacturing MetalCoat Acrylic Metal Primer	I/E	93	N/A	300	Steel, galvanized iron and aluminum	Thermoplastic acrylic emulsion, rust inhibiting pegments, tough and flexible film, excellent adhesion, outstanding corrosion resistance	30 min touch 4 hr recoat
Benjamin Moore, M04 Acrylic Metal Primer	P/I/T	51	40	320	Metal including galvanized, barrier coat over zinc coated surfaces, damp surfaces, poured or cast concrete and brick	Rust inhibitive, fast dry, excellent adhesion	30 min touch 2 hr recoat
Cloverdale Paint, 70329 Ecologic Rustex WB Primer	I/E	99	40	641	General purpose direct-to-metal primer for properly prepared ferrous and non-ferrous metals at industrial, commercial and/or institutional applications	Good corrosion resistance, re-coat tolerant, adhesion to wide range of substrates	15 min touch 2 hr recoat
Color Wheel Paints & Coatings, 1635 Aquatec Industrial Acrylic Primer	P	87	44	300-500	Structural steel, aluminum, galvanized metals, ferrous metals, copper, stainless steel, fiberglass, polystyrene	Chemical resistant, corrosion resistant, fast drying, early moisture resistant, early rust resistant	30 min touch 2 hr recoat
Davis Paint Company, 0790 Acrylic Stain Block	I/E	71	42	400	All ferrous and non-ferrous metals, wood and wood by-products, masonry, drywall	Durable, sandable, can be used to block smoke damage and stains	30 min touch 2 hr recoat
Diamond Vogel Paints, MC Series, V-Cote 200 Acrylic Maintenance Primer/Finish	I/E	91	39	209-313	Bare or previously painted steel, galvanized metal, wood, aluminum, masonry	Outstanding adhesion, corrosion inhibitors, non-yellowing, excellent durability and fade resistance	½-2 hr touch 2-4 hr recoat
Duron Paints & Wallcoverings, 33-105 Acrylic Metal Primer	I/E	80	34	225-250	Galvanized and ferrous metal surfaces, aluminum	Quick dry, resistant to peeling and chipping, rust resistant, tintable	1 hr touch 8 hr recoat
EPMAR, Sta-crete #47 Industrial Metal Primer WB Acrylic	I/E	58	40	250-300	Steel storage tank exteriors, steel bridges, piping and pump equipment, rebar, OEM metal applications, marine steel decks	corrosion resistance, fast dry, highly adhesive, moisture tolerant, single component	2 hr topcoat 48 hr cure
EPMAR, Kemiko Col-R-Tone III Acrylic Urethane	I/E	49	60	300-400	Floors, facades, steel, concrete storage tank exteriors, concrete bridges, pump equipment	UV, abrasion and stain resistance, resilient, non-yellowing, quick dry,	1 hr recoat 48 hr cure
Farwest, X-6785 Aquashield II Fast Dry Red Oxide Waterborne Shop Primer	I/E	76	38	300-400	Metal Surfaces	Water and corrosion resistant film	30-45 min touch 1-3 hr recoat

Farwest, X-6791 Aquashield II, Waterborne Rust- Inhibitive Primer	E	76	38	300-400	Metal Surfaces	Fast drying, water and corrosion resistant film	30-45 min touch 1-3 hr recoat
Flex Bon Paints, 194 Series, Premium Acrylic Primer	I/E	70	39	400	Concrete, masonry, stucco, wood, steel, galvanized metal, aluminum, asbestos siding, plaster or hardcoat	Alkali resistant, good stain blocking, flash rust resistant	2-4 hr touch 18 hr recoat
Frazee Paint (PPI), 066 Envirokote Acrylic Copolymer Primer	I	4	42	100-400	Concrete, masonry, drywall, plaster, hardboard, metal, wood	Top of the line quality	1 hr touch 2-3 hr recoat
Frazee Paint (PPI), 168 Prime Plus Acrylic Primer Sealer Stain Killer	I/E	60	45	200-400	Concrete/masonry, drywall, plaster, metal, wood	Resists alkali on concrete and masonry, not for use on floors	1 hr touch 2-3 hr recoat 7 day cure
Hallman Lindsay Quality Paints, 178 Metal Kote 100% Acrylic DTM	I/E	39	37	320	Refinishing and/or restoring commercial, office and light industrial structures	Corrosion-Resistant formulation, outstanding adhesion, color and gloss retention	2 hr touch Overnight recoat
ICI Paints (Devoe) 4020PF DEVFLEX WB Acrylic Direct-to-Metal Primer & Flat Finish (1000 White/7100 Red)	I/E	76-80	44	275-350	Exterior of tanks, metal buildings, structural steel, piping, handrails, masonry construction	Direct-to-metal or masonry primer, low odor, resists flash rust, corrosion resistance, fast dry	30 min touch 2 hr recoat
ICI Paints (Devoe), 8502 White/8520 Red Oxide Mirrolac-WB Acrylic Direct-to-metal Flat Primer and Finish	I/E	77	44	275-350	For exterior tanks, metal buildings, structural steel, piping, handrails and masonry construction, steel, weathered or properly cleaned galvanized steel and masonry in institutional, residential and light industrial areas.	Non-flammable, fast dry and recoat, resists flash rust, corrosion resistance, hard durable film.	30 min touch 2 hr recoat
Insl-X Superior Coating Systems, RA-0104 Rust Arrestor	I/E	90	26	208	Rusted areas where sandblasting is not acceptable, repair and maintenance of existing systems	Chemically converts tightly adhered rust to a black iron complex thus stopping the corrosion mechanism	2 hr touch 4 hr recoat
International Protective Coatings, Intercryl 520 Waterborne Acrylic	E	43	44	353	Properly prepared metal, concrete, wood at offshore structures, bridges, refineries, petrochemical and chemical plants	Rust inhibitive	30 min touch 1 hr hard dry
Manufacturing & Consulting Chemists Inc, 208 Series DTM High Build Acrylic Topcoat	I/E	100	40	N/A	Steel, aluminum, galvanized surfaces, plastic and glass	Excellent adhesion, good abrasion and chemical resistance	30 min touch 1 hr to handle 72 hr cure
Monopole Inc, Monochem Aquaprime DTM, Acrylic Co-polymer	I/E	<100	36	200-450	Steel surfaces, adheres to most substrates	Rust inhibiting to accept a variety of corrosive and chemical resistant topcoats	1 hr touch 1 hr recoat
Parker Paint (PPI), 1821 Galv-O-Prime, Acrylic Latex	E	75	45	490	Galvanized and aluminum surfaces	Excellent coverage, durability, adhesion and self etching. Resists cracking, checking, peeling and corrosion	2 hr tack free 24 hr recoat
Porter Coatings (PPG), 2809 Porter Guard, DTM Acrylic Satin Enamel	I/E	85	39	250-400	Properly prepared iron, steel, aluminum, galvanized metals, and many prined surfaces such as masonry and wood	High hiding, non-yellowing, excellent touch-up, flash rust resistant, washable	15-30 min touch 4 hr recoat
Premium Coatings, LLC, Premium Liquid Rubber ® Premium 204	E	0	N/A	N/A	Fully bonds to most substrates. Numerous applications such as corrosion and rust protection of most metals, waterproofing & concrete protection, roofing repairs.	Water based, odorless, non toxic, free of VOC's, single component.	24 hr cure
Sierra Performance (Rust-Oleum), MetalMax DTM Acrylic Urethane	I/E	0	40	180-545	Aluminum, galvanized steel, steel	Excellent corrosion and humidity resistance, UV resistant, fast drying, self-priming	30 min touch 2-4 hr recoat
Spectra-Tone Paint Corporation, #975 DTM Acrylic Gloss Enamel	I/E	78	36	400-500	Wood, metal, or masonry surfaces including walls, doors, trim, sash, and piping	Superior adhesion, direct-to-metal, extremely tough, fast drying, flexible, corrosion and abrasive resistant, block resistance, resists staining	2-4 hr touch 4 hr recoat

Thortex America, Inc., Corro-Tech R.C. Single Component	P	56	37	159	Designed for use as a rust conversion primer for use on manually prepared rusty steelwork in non aggressive environments.	High performance water based anti-corrosive treatment, with additives to produce a coating when applied to manually prepared rusty steel converts residual rust into a chemically bonded hydrophobic passive layer which can be overcoated.	30 min touch
Thortex America, Inc., Corro-Tech W.P. Single Component	E	84	45	97	Designed for long term protection of blast cleaned mild steel and cast ferrous substrates.	High performance water based system with anti-corrosive resistance.	20 min touch

N/A= Not Available

Stains (Exterior ≤ 100 g/l)

Coating Company and Product Name	Opaque Semitransparent Transparent Wiping	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Recommended Substrate/Exposure	Coating Characteristics	Drying Time
Benjamin Moore, 179 Super Spec Acrylic Solid Color Exterior Stain	O	37	29	300-450	Rough wood siding, shakes, shingles, hardboard siding, trim and fencing, masonry, stucco	Fast dry, excellent hiding and adhesion, alkali, blistering, mildew resistant	2 hr touch 3 hr recoat
Benjamin Moore, N089 100% Acrylic Latex Solid Siding Stain	O	7	33	200-400	Rough siding, plywood, hardboard and fiber-cement siding, shakes, shingles, trim, railings, fencing, stucco, masonry and aluminum	Fast drying, mildew resistant, excellent color retention	2-3 hr touch 3-4 hr recoat
Columbia Paint & Coatings, Woodtech Solid Color Latex Stain 09-400	O	71	34	290	Wood siding, hardboard, brick, concrete, galvanized and aluminum metal	Excellent water resistance, adhesion, color retention, alkali resistant, stain blocking	½-1 hr touch 2 hr recoat
Davis Paint Company, 3900 Zytec Wood Oil Protector	T	47	94	150-300	Fences, siding or other vertical surfaces	Contains a special non-drying natural oil to provide maximum water repellency, contains mildewcides	Non-drying to touch Overnight recoat
Degussa/ChemRex, Thoro Pigmented Sealer, WB Acrylic Stain	S	92	30	260-320	Concrete, stucco, brick masonry	Color uniformity, resistant to dirt pickup, vapor permeable, UV resistant	1-2 hr touch 2-4 hr recoat 5 day cure
Dunn Edwards, W 704 Acri-Flat 100% Acrylic Ext Wood Stain/Masonry Flat Paint	O	70	40	300-400	Masonry, concrete, tilt-up, block, stucco, plaster, exterior metal	Excellent color retention, good grain crack resistance, self-priming	1-2 hr touch 4-6 hr recoat
E-3 Coatings Inc, Envirolast XT Wood Stain & Seal	S/T	0	25	250-350	Decks, siding roofs, fences and ourdoor furniture	Deep penetration, full transparency, excellent adhesion, high durability, emulsified long oil alkyd, use over oil stains	15-30 min tack Immediate recoat 12-24 hr cure
EPMAR, Kemiko Stone Tone Concrete Stain	O	0	N/A	N/A	Concrete driveways, patios, walkways,	UV Resistant, interior/exterior application, acid base,	N/A
EPMAR, Rembrandt Polymer Stain, Water Extended Acrylic Urethane	O	<49	20	150-300	Concrete, plaster, polymer cement, and wood as a stain, wash or faux finish	Chemical resistant, excellent adhesion, UV stability, outstanding wear qualities	0.5-1 hr touch 2-3 hrs clear coat
Fmi Paint and Stain Corp. 410 Series Stormcoat 100% Acrylic Body Stain	O	46	25	250-300	All wood surfaces	Fade resistant, excellent leveling and hiding, unsurpassed color retention	30 min touch 2 hr recoat
Fuhr International, 105 AcrylicWiping Stain	W	30	14	N/A	Any wood surface	Little to no grain raising, compatible with pigments & dyes, may be force dried with heat, film forming, fast drying	45 min. before seal
Fuhr International, 155 ZVOC Universal WB Acrylic Stain	O	0	14	N/A	Any Interior wood surface	Little to no grain raising, compatible with pigments & dyes, may be force dried with heat, fast drying	15 min before seal

Fuhr International, 5800 ZVOC WB Acrylic Stain	O	0	14	N/A	Interior/Exterior wood substrates such as furniture, molding, millwork, cabinets, doors, decks	Little to no grain raising, excellent substrate wetting and color control, chemical resistant, water resistant, excellent durability	5 min. touch 20 min. before seal
Fuhr International, 5900 ZVOC WB Acrylic Deck Stain	O	0	30	N/A	Furniture, molding, millwork, cabinets, doors, decks	Chemical resistant, water resistant, excellent substrate wetting and color control, overall durability, UV protection, fast dry	5 min. touch 20 min before seal
General Paint (PPI), 72-Line Woodcraft Solid Colour Latex Stain	O	98	27	220-290	Exterior smooth or rough siding, shakes, shingles and fencing	Quick drying, densely pigmented	15-60 min touch 1-2 hr handle 4 hr recoat
General Paint (PPI), 74-Line Platinum 100% Acrylic Stain	O	100	33	260-350	Exterior smooth or rough siding, shakes, shingles and fencing	Quick drying, densely pigmented, mildew resistant, fade resistant	15-60 min touch 1-2 hr handle 4 hr recoat
Hallman Lindsay Quality Paints, 185 Kril Tone 100% Acrylic Solid Color Stain	O/S	98	35	400	Shingles, shakes, siding, fencing, most hardboard	Outstanding color retention, mildew resistant, excellent adhesion, durable	2 hr touch overnight to recoat
ICI Paints (Dulux), E600-XXXX Wood Pride 100% Acrylic Premium Solid Color Wood Stain	O	101	34	250-350	For horizontal or vertical wood siding clapboard, hardboard, shakes, shingles, beams, fences	High hiding, mildew resistant, fade resistant, UV protection, water repellent, excellent touch-up	1 hr touch 4 hr recoat
ICI Paints (Sinclair), 4700 Acrylic Stainteke	O	87-98	36	300-400	Wood, stucco, masonry, primed metal	Mildew resistant, water resistant	½-1 hr touch 4 hr recoat
Kelly-Moore Paints, 1285 Acry-Shield Oil/Latex Stain Base, Vinyl Acrylic, Alkyd, Oil	T	65	33	500-600	Wood for residential or commercial application	Excellent westher resistance and color retention	1 hr touch 4 hr recoat
Martin Senour, 41-1006 Great Outdoors Latex Solid Color Wood Siding Stain - Better	O	71	25	400	Smooth or rough-sawn lumber, siding, composition board, shakes, shingles, fences, metal and masonry	Chalk, fade, bleed resistant, fast drying and self priming	1 hr touch 4 hr recoat
Martin Senour, 45-1001 Great Outdoors Latex Solid Color Wood Siding Stain - Best	O	97	34	400	Wood siding shingles, shakes, pressure-treated wood, cedar, redwood, smooth or rough-sawn lumber, textured or abraded plywood, composition board and fences	Chalk, fade, bleed and mildew resistant, fast drying and self priming	1 hr touch 4 hr recoat
Okon Inc, OK-710 Weather Pro, Acrylic Emulsion	S with pigment	70	15	50-250	Interior/Exterior decks, fencing, shakes, siding	Super color retention, UV resistant with colorant, water repellent	2 hr touch
Resene Paints Limited, D57a WB Woodsman Penetrating Oil Stain	T	85	N/A	N/A	Beams, fences, plywood, timber, siding	Fully penetrating on bare wood, contains fungicide, easy application	24 hr recoat
Sherwin Williams, 105.12 ProMar Exterior Solid Color Acrylic Latex Stain A16 Series	O	97	32	200-400	Wood sawn lumber, plywood, shakes, shingles, masonry, concrete, aluminum	Fast application & drying, good penetration	1 hr touch 4 hrs. recoat
Silvertown Products, Rhinoguard Furniture Stain and Finish	O/S/T	0	N/A	N/A	Furniture, doors, wood beams	Fade Resistant, resistant to many oils and greases, contains Gilsonite	24 hr recoat
Silvertown Products, Rhinoguard Wood Defense	O/S/T	0	30	550	Wood, decks, siding	UV, scuff, water, mildew and fungus resistant contains Gilsonite	24 hrs to walk 72 hrs recoat
Tamms Industries, T-96 Aquastain Based on Acrylic Resins	O	<50	35-45	60-225	Used to protect and provide a uniform color finish to precast or poured concrete, brick, concrete block or stucco. For architectural finishes, sound walls, highway bridge structures, median barriers, retaining walls, and as a decorative finish for concrete.	Water based, decorative, penetrating stain, used on interior or exterior surfaces, it resists ultraviolet degradation, airborne dirt, smog, industrial fumes and other atmospheric chemicals.	15-45 min touch 3-6 hr cure
Van Technologies Inc, 220 Van Aqua WB Wood Stain	O	49	N/A	N/A	Wood surfaces	Fast drying	10-20 min dry
Vista Paint, 3000 Acribond 100% Acrylic	O	97	40	300-400	Wood, properly primed concrete, stucco, masonry and metal	Solid bodied, durable matte flat finish, mildew resistant, excellent color retension	1 hr touch 4-6 hr recoat

N/A= Not Available

Water Proofing Sealers (≤ 100 g/l)

Coating Company and Product Name	Penetrant Film Former	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Recommended Substrate/Exposure	Coating Characteristics	Dry Time
American Formulating and Manufacturing Safecoat Penetrating WaterStop	P	0	N/A	200-300	Porous brick, pavers, concrete block, concrete and stucco	Good water resistance, non-toxic, low odor, interior/exterior	24 hr recoat
American Formulating and Manufacturing Safecoat WaterShield	P	14	N/A	250-300	Porous cementitious materials such as concrete, stucco, brick, block, terrazzo and unglazed tile	Water repelling sealer, resists oils and grease, fast drying, excellent adhesion, control efflorescence in masonry surfaces	2 hr touch 24 hr recoat
Andek, Polagard S, PVC Terpolymer	FF	0	N/A	90-120@10 mils	Areas prone to microbiological growth such as areas were food and drink are stored or prepared	High build elastomeric, waterproof, won't trap water, protection against mold and mildew	2-4 hr recoat
BEHR, Elastomeric Masonry, Stucco & Brick Paint 100% Acrylic Latex - 68	FF	83	N/A	75-125	New or previously painted vertical surfaces made of stucco, masonry, concrete, block, brick, cement, adjacent wood or metal trim	Flexible high-build coating, extremely durable, mildew & dirt resistant, waterproof, breathable film, excellent color retention, excellent adhesion	4-6 hr touch 24 hr recoat
Davlin Waterproof Coatings, Acrylastic 490 Waterborne Elastomeric Waterproof Wall Coating	FF	75	60	100	Interior and exterior Concrete, masonry, stucco, most wood & metal substrates	Superior adhesion and waterproofing, peel resistant, extremely tough, resistant to alkali, salt and fungus	4-8 hr recoat
Davlin Waterproof Coatings, Acrylastic 600, Waterproof Deck Coating	FF	75	51	100	Decks, patios, balconies, terrace, stairs	Extremely tough, superior flexibility, highly resistant to alkali, salt, ozone, acid rain, UV	3-8 hr recoat
Davlin Waterproof Coatings, Butylseal 572 Sealer,	P	7	N/A	75-250	For concrete, masonry, stucco and wood surfaces	Good flexibility, adhesion, excellent sealing over chalky or porous surfaces	4 hr recoat
EPMAR, SS2102 Sta-Crete Urethane Membrane, 2	FF	0	100	100	Excellent water barrier for steel, concrete or wood surfaces	Chemical and moisture resistant, excellent strength, 30 minute pot life	5 hrs to touch 24 hrs to walk
Euclid Chemical Company (RPM), Super Wall-Pro	FF	75	N/A	100	Masonry, concrete, stucco, metal, stone, plaster, cinder block, insulating finish systems	Elastomeric for excellent resistance to movement, UV stable for exterior exposure, waterproof veneer, excellent weathering resistance	1 hr cure
GE Sealants & Adhesives, VIP1510 Water Repellent,	P	4	10	100-250	For vertical masonry substrates such as stone, tilt-up concrete, brick, clay tile, stucco and block	UV stable, excellent water repellency, dries clear, non-yellowing, alkali resistant, breathable	72 hr partial cure 7 day full cure
Hallman Lindsay, 180 Elastaguard Elastomeric Coating, 100% Acrylic	FF	26	53	80	Exterior concrete, masonry and stucco.	Flexible, water-resistant coating, high build, mildew-resistant, chalk-resistant, bridges hairline cracks, excellent adhesion.	4 hr touch 24 hr recoat
Henry Company, 787 ElastoMulsion Waterproofing & Dampproofing,	FF	0	70	25	Above- and below-grade concrete, masonry structures including block foundations	Seamless rubberized asphalt membrane, weathers uniformly, resilient, excellent adhesion, non-flammable	8 hr touch 24-48 hr cure
ICI Paints (Dulux), 2260 Smooth, 2270 Fine, 2290 Coarse Decra_Flex Elastomeric Acrylic Coating	FF	62-73	45-50	60-115	Above grade vertical masonry, stucco and poured concrete. Also on primed wood, metal and previously painted surfaces	flexibible, bridges hairline cracks, resists dirt pickup, mildew resistant, excellent color retention, waterproof film	4 hr touch 24 recoat
Monarch Paint Company (PPG), 2500 High Performance 100% Acrylic Elastomeric Waterproof Coatings	FF	84	51	60-100	For new or previously painted above-grade masonry, concrete and stucco surfaces	Chalk resistant, breathable, flexible, bridges hairline cracks, waterproof coating	2 hr touch 24 hr recoat
Monopole Inc, 3500 Monochem Aquaseal 2 for Wood, WB Acrylic Micro Emulsion	P	0	N/A	60-250	Solid siding, trim, fencing, plywood, shakes, shingles, deck lumber, patio furniture, doors, window sashes, hardboard, particleboard	Deep penetration, outstanding water repellency, breathable	N/A

Monopole Inc, 3800, 3900 Monochem Permaseal, WB Acrylic Co-Polymer Emulsion	P	<70	N/A	70-325	Interior/Exterior concrete floors, decks, docks, ramps and pavements	Hard and abrasion resistant, resists penetration of oil, grease and certain chemicals, helps control efflorescence and cracking, resists water blushing and standing water, UV resistant	½-1 hr touch 24 hr cure
Pittsburgh Paints (PPG), 4-110 Perma-Crete, 100% Acrylic Latex	FF	98	46	100-134	For exterior masonry surfaces, including properly prepared and primed stucco, cured concrete, cinder block, or for recoating over sound previously painted surfaces.	Excellent flexibility and moisture resistance, the 100% acrylic high build formula repels water.	2½-3 hr touch 6-8 hr recoat
Rodda Paint, 511301 Super Roflex Elastomeric Coating, 100% Acrylic Emulsion	FF	89	51	100	Designed as a weather seal, and restoration coating for all types of masonry structures.	A self cleaning, durable, low angular sheen finish. Pliability and elasticity allow for building movement without cracking of the coating while a tough outer skin provides protection for normal usage.	3 hr touch 16 hr recoat
Samuel Cabot Inc, 1000 Cabot Waterproofing With Teflon Surface Protector, Silicone Emulsion	P	0	6	150-250	New or properly reconditioned wood including siding, shingles, decks, shakes, fences, roof, and log homes. Also brick, concrete, masonry, stone and unglazed tile	Unsurpassed water-proofing protection, mildew resistant, repells oil and grease staining, resistance to dirt pick-up and mildew	3 hr touch 24 hr cure
Sherwin Williams, 102.35 ConFlex XL Texture High Build A5-800 Series	FF	94	49	70-80	Concrete, stucco, masonry	Extremely strong adhesion, mildew resistant, flexible, durable	4 hrs touch 24 hrs recoat
Sherwin Williams, 102.36 Sherlastic Elastomeric Coating A5-100 Series	FF	94	41	115-160	A masonry coating system. This may be applied to a surface with a pH of 6 to 12.	Provides excellent flexibility, durability, and weather resistance. This product will protect against wind-driven rain when used on tilt-up, pre-cast, or poured-in-place concrete, CMU, and stucco.	4 hr touch 24 hr recoat
Sherwin Williams, 111.24 H&C WB-50 Water Based Water Repellent, Clear	P	0	3	75-200	Unglazed tile,brick, concrete, plaster	Permeable to water vapor, will not discolor concrete, economical water repellency, retards mold and mildew growth, 5% silicone	1-4 hrs touch When dry for recoat
Tamms Industries, Tammolastic, Elastomeric Acrylic Coating	FF	<50	N/A	50-80	For exterior concrete, stucco, brick and masonry surfaces.	Flexible, waterproof, bridges hairline cracks. Excellent adhesion, film breathable, resistance to weathering over a long time	12-24 hr recoat

N/A= Not Available

Water Proofing Concrete/Masonry Sealers (≤ 100 g/l)

Coating Company and Product Name	Penetrant Film Former	VOC content (gm/l)	Solids (% by volume)	Coverage (sq ft/gal)	Recommended Substrate/Exposure	Coating Characteristics	Dry Time
AllPro Corporation, All-Seal Waterproofing Clear Sealer	P	47	14	100-250	Concrete, masonry, stucco, roof, brick, stone, adobe, drywall, plaster, roof tiles, grout, galvanized metal, vinyl siding, wood decks	Highly penetrating, UV, alkali resistant, water repellant	1 hr touch 4-6 hr recoat
Anchor Paint, P-1120 Uni-Kote Silicone Water Repellant	FF	0	13	209	Above grade vertical surfaces such as block, brick, stucco, hardboard, siding, and natural stone	Excellent flexibility and water resistance	20 min touch 1 hr recoat
Andek, Polagard Fibrelastic, PVC/Acrylic WB	FF	0	N/A	120@10 mils	Concrete, splitface block, brick, stucco, wood, asbestos shingles, concrete block, mineral composites, precast concrete	UV, mildew and chemical resistance, excellent alkali resistance, breathable, waterproof, elastomeric	N/A
Andek, Polaseal M-A, Siloxane-Based	P	0	N/A	100-200	Brick, stucco, block, concrete, stone, clay tile, slate, and exposed aggregate	Incredibly durable barrier against weather, pollutants, de-icing chemicals and UV	N/A

Andek, Polaseal W, WB Silanoate	P	0	N/A	100-200	For use on limestone, together with all natural color masonry such as concrete, block, stone, and stucco	Forms ion exchange linkages independent of alkalinity or silica content, stops liquid phase water penetration, retards oil penetration, waterproof	N/A
BEHR, No. 980 Concrete & Masonry Silicone Waterproofer	P	12	N/A	250	Block, pavement, stucco, brick, unglazed tile, concrete, slate	Excellent penetration, resists spalling, efflorescence, mildew	24-48 hr recoat
ChemMasters, Colorlastic, 100% Elastomeric Acrylic	FF	48	N/A	100-150	For exterior or interior, above grade, vertical and overhead concrete and masonry.	Pigmented, waterproof coating, bridges hairline cracks, decorative sealer, excellent elongation, UV stable, resists wind driven rain, mold, dirt.	24 hr recoat
ChemMasters, ColorSil, Pigmented Silicate Surface Treatment	P	0	N/A	150-200	Uses include interior or exterior, vertical or overhead, concrete and masonry surfaces, concrete block, brick, stucco, wood.	Cures to a natural matte finish, inhibits growth of mildew, fungus and algae, exceptional durability and water repellency, improves abrasion resistance, resists atmospheric conditions, exhaust gases, acid rain, airborne pollutants.	2-4 hr touch
ChemMasters, SpallGuard WB 10%, Chemically reactive Oligomerous Alkylalkoxy Siloxane	P	0	10	100-150	For horizontal or vertical, exterior/interior cured concrete and masonry at marine structures, vehicular repair and wash down facilities.	Siloxane water repellent for concree and masonry, prevents spalling of new concrete surfaces due to freeze/thaw cycling, seals pores.	24-48 hr touch
ChemMasters, Textured II, Textured 100% Acrylic Emulsion	FF	44	73	100	Used for interior or exterior, vertical or overhead concrete and masonry surfaces.	Superior color stability, excellent hiding power, resistant to stains and chemicals, will not crack, excellent hiding, resistant to dirt & atmospheric pollutants.	2-4 hr recoat
Degussa/ChemRex, Thoroclear Special, Siliconate	P	0	N/A	200-300	Vertical/horizontal concrete, aged limestone	Penetrates, seals, water repellent, breathable	N/A
Degussa/ChemRex, Thorocoat 200 WB 100% Acrylic I/E, Pigmented	FF	92	39	125@5 mils dry film	Concrete/masonry, plaster/stucco, gunite/shotcrete, brick/stone for vertical and overhead surfaces	Smooth waterproof coating, high light reflectivity (white)	1-2 hr touch 2-4 hr recoat
Degussa/ChemRex, Thorocoat DOT, Pigmented 100 % Acrylic	FF	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, high-build, excellent hiding	1-2 hr touch 2-4 hr recoat 8 hr cure
Degussa/ChemRex, Thorocoat F-74, Pigmented Acrylic	FF	56	50	60-80	Pedestrian traffic concrete decks, floors, walkways, stairs, swimming pool decks	Skid, UV and weather resistant	24 hr recoat
Degussa/ChemRex, Thorogard, Pigmented	FF	44	47	80	Exterior above grade walls, previously coated surfaces, aged stucco, concrete, plaster	Flexible, breathable, UV, weather resistant, excellent hiding	5 hr touch 12-24 hr recoat
Degussa/ChemRex, Thoroglaze, Clear WB Semi-Gloss Acrylic-Methacrylate Sealer	FF	75	N/A	100-300	Concrete, concrete aggregate panels, stucco, vertical surfaces, interior/exterior	Durable, non-yellowing, breathable, semi-gloss finish	2-4 hr recoat
Degussa/ChemRex, Thorolastic, Pigmented 100% Acrylic	FF	38-50	58	50-100	Exterior above grade concrete structures, brick and concrete masonry	Excellent color retention and UV resistance, wind driven rain resistance, CO2 diffusion barrier, flexible, breathable,	6 hr touch 12-24 hr recoat
Degussa/ChemRex, Thoroseal, Cement-Based	FF	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, resists both positive and negative hydrostatic pressure	60-90 min pot life 7-10 day cure
Degussa (ChemRex Inc/Sonneborne), Conipur II Deck Coating System; Conipur 78 Primer, Conipur 265-Z Base, Conipur 275 Top Coat	FF	10 P 5 B 13 T	99	300-350 P 300 B 765 T	Parking ramps, elevated concrete slabs, mechanical rooms, stadiums, plywood	2 Component reactive cure, elastomeric polyurethane, protects from choloride intrusion, excellent chemical resistance and durability, superior abrasion resistance, resists chemicals	2 hr recoat for P 3-4 hr recoat for B 24 hr cure for all
Duron Paints & Wallcoverings, 80-071 Dura Crete WB Waterproofing Sealer	FF	47	14	100-250	Above-grade concrete/masonry, stucco, brick, stone, adobe, drywall, plaster, roof tiles	UV protected, waterproofing sealer, alkali and mildew resistant, non-yellowing	45-60 min touch 4 hr recoat

EPMAR, 1500 Sta-Crete Epoxy Tank Lining, 2	FF	0	100	200-400	Concrete, fiberglass and steel surfaces subject to continuous abrasion service, chlorine water immersion, salt water immersion such as fountains, aquariums, and water slides	Excellent adhesion, chemical resistance, dries to a resilient porcelain-type gloss film, self-priming, 20 minute pot life	6 hr recoat 3 day cure
Everest Coatings, Evercoat 7000S High Modulus Waterproof Pigmented Coating, 1	FF	69	60	50-100	Concrete, masonry, stucco	Durable, UV, and mildew resistant; good adhesion to cement & mortar	3 hr touch 12-24 hr recoat
Farwest, X-5645 Aqueous Concrete Clear Sealer	FF	62	22	117-352	Concrete Floors	Excellent weathering, chemical, alkali, water resistance	1 hr touch ½-6 hr recoat
Gaco Western Inc, GacoFlex LM-60 Liquid-Applied Urethane, 2	T	0	100	25	High-build waterproofing membrane over concrete, metal, plywood. To line potable water storage tanks and water treatment facilities	Excellent durability to 180º F, excellent resistance to water immersion, good salt and alkali resistance, fair acid and solvent resistance, excellent hydrolytic stability	1 hr touch
GE Sealants & Adhesives, VIP1510 Water Repellent,	P	4	10	100-250	For vertical masonry substrates such as stone, tilt-up concrete, brick, clay tile, stucco and block	UV stable, excellent water repellency, dries clear, non-yellowing, alkali resistant, breathable	72 hr partial cure 7 day full cure
Ideal Products LLC, Sani-Tred Permaflex, High-Solids Moisture-Cured Polyurethane	FF	0	90	N/A	Concrete, wood, aluminum, steel, some plastics as well as all other standard buiding materials	Water repellent, excellent adhesion, UV, chemical, blister, cracking, peeling resistant	N/A
Karnak, LL10, LL20, Water Repellents, Silane Modified Siloxane Emulsions	P	40-80	N/A	125-175	Facades, pre-cast concrete, roadways, stucco, brick, terra-cotta, brick	Water repellent, good penetration, prevents spalling and concrete corrosion	7-10 day cure
L & M Construction Chemicals Inc, Aquapel & Aquapel Plus, Alkylalkoxysilane Solutions	P	< 50	N/A	100-200	Interior/Exterior above gradel concrete surfaces, brick pavers, exposed aggregate surfaces	Highly resistant to moisture and salt, deep penetration, breathable	7-10 day cure
L & M Construction Chemicals Inc, Seal Hard, Alkylalkoxysilane Solution	P	0	N/A	200	Concrete floors	Abrasion resistant, non-yellowing, chip and peel resistant, odorless, resists oil contamination, increase wear surface strength, waterproofs	2-4 hr recoat 3 day cure
Life Paint Company, 1325 Micro-Life Concrete Masonry Sealer, Clear	P	1	6	50-150	Interior/Exterior concrete and masonry blocks, stucco, walls, stones, porous tiles, cement block	Fast drying, penetrating	30 min to use
Monopole Inc, 2000 Monochem Aquaseal Formula WB Fluorochemical, of Hydrophobic & Oleophobic characteristics	P	30-60	N/A	100-600	Concrete, natural stone, marble granite, slate, brick, unglazed ceramic tile. Suitable for garage floors, driveways, patios, swimming pool areas	Stain resistant, incredible water repellency, UV and biological resistant, non-yellowing, reduces dirt pickup, efflorescence	1-2 hr recoat
Monopole Inc, 2020 Monochem Aquaseal Silane 20, Clear	P	<65	N/A	60-160	Parking decks, garages, ramps, bridges, airport aprons, stadiums, buildings, precast and prestressed concrete and brick substrates, stucco, dryvit	20% alkalkozysilane, deep penetration, optimum resistance to efflorescence, protection against freeze/thaw cycles, does not clog pores or capillaries, releases ethanol, impregnation emulsion for regular or reinforced concrete	1-2 hrs recoat
Monopole Inc, 2040 Monochem Aquaseal Silane 40 Exterior, Clear	P	86	N/A	60-160	Parking decks, garages, ramps, bridges, airport aprons, stadiums, buildings, precast and prestressed concrete and brick substrates, stucco, dryvit	40% alkalkozysilane, deep penetration, optimum resistance to efflorescence, protection against freeze/thaw cycles, does not clog pores or capillaries, releases ethanol, impregnation emulsion for regular or reinforced concrete	1-2 hrs recoat
Monopole Inc, 4300 Monochem Aquapell Waterproofing, WB Acrylic Clear, Micro Emulsion	P	0	N/A	40-300	For porous materials such as concrete clocks, stucco, tilt-ups and all wood products	Helps stop efflorescence, prevent moisture and water leaching, reduces bleaching due to UV rays	15-30 min touch
Monopole Inc, 5200 Monochem Aquaseal ME 12, Silane Oligomeric Alkyl Alkoxysiloxane Micro Emulsion Solution	P	<100	N/A	40-80	Interior/Exterior Vertical applications on concrete and masonry	Excellent UV and water resistance, breathable and permeable to water vapor, helps stop concrete dusting and stucco spall off	1-2 hr recoat

Monopole Inc, 7100 Monochem Elastoseal, Silicone Fortified, copolymerized with Polydimethylsiloxane Oligomers	P	20	N/A	50-150	Interior/Exterior, new or ole porous concrete, stucco and masonry surfaces	Long life (15-20 yrs), for damp and dry surfaces, breathable, control efflorescence, mildew and stains	1 hr recoat
Okon Inc, OK-970 Waterstopper, Acrylic Emulsion/Glass Sphere Technology	FF	70	59	75-125	Interior/Exterior, above or below grade basement walls, block walls, brick, foundations walls, retaining walls, stucco	Low abrasiveness, non-flammable, UV resistant, breathable, waterproofer	30 min touch 3 hr recoat 10 day immersion
Poly-Carb, Mark 87.6 Smooth Elastomeric Wall Pigmented Coating	FF	100	N/A	N/A	Masonry, block, concrete, stucco and cement	Flexible, breathable, UV resistant, resists salt spray and environmental attack, resists extreme temperatures	N/A
Poly-Carb, Mark 154, Pigmented Sealers 2	FF	0	100	N/A	Highway bridge decks	Flexible, de-slicking	N/A
Poly-Carb, Mark-163 Flexogrid, Pigmented Sealer 2	X	0	100	N/A	Highway bridge decks, parking decks and observation decks. Excellent bond to metal, concrete, and asphalt surfaces	Flexibe, de-slicking, non-porous, fast-curing,	N/A
RainGuard International Products Co, Blok-Lok Clear Water Repellent Super Clear Water Repellent Regular Clear Water Repellent Concrete & Masonry Waterproofer	P	37	N/A	45-120	Masonry, concrete, stucco, EFIS, composite	Modified polysilanes, water repellent, UV resistant, prevents spalling and cracking caused by freeze thaw cycles, deep penetration, helps prevent chloride ion intrusion and efflorescence	1 hr touch 24 hr recoat 24-36 hr cure
Resene Paints Limited, D62 X-200 Acrylic Waterproofing Membrane	FF	89	N/A	54-81	Concrete block, concrete surfaces, fiber cement	Very good abrasion and chemical resistance, excellent durability, superior void and crack filling	1 hr touch 3 hr recoat
Samuel Cabot Inc, 1000 Cabot Waterproofing With Teflon Surface Protector, Silicone Emulsion	P	0	6	150-250	New or properly reconditioned wood including siding, shingles, decks, shakes, fences, roof, and log homes. Also brick, concrete, masonry, stone and unglazed tile	Unsurpassed water-proofing protection, mildew resistant, repells oil and grease staining, resistance to dirt pick-up and mildew	3 hr touch 24 hr cure
Seal-Krete Inc, Seal-Krete Heavy Duty Waterproofer, High Solids Acrylic	P	15	25	50-300	Vertical surfaces only, stone, brick, adobe, wood fencing, plaster, drywall, galvanized metal, alumimum siding, masonite, binds chalky surfaces	Waterproofing, excellent adhesion, non-yellowing, flexible, breathable	2-4 hr touch 2-4 hr recoat
Seal-Krete Inc, Seal-Krete Original Waterproofing Sealer, Acrylic	P	8	10	200-300	Vertical concrete and masonry surfaces such as brick, block, stucco, plaster, stone and wood fencing, galvanized metal, aluminum siding	Non-yellowing , good adhesion and penetration, UV stable, breathable	2-4 hr touch 2-4 hr recoat
Spectra-Tone Paint Corporation, #223 Zaptex Elasto-Coat High Build Waterproofing Coating, 100% Acrylic Elastomeric Emulsion Polymer	FF	100	52	41-82	Interior/exterior masonry, stucco, cement block, hollow tile, split face block, cinder block, sandblasted block or concrete, construction grade plywood or siding and most porous substrates.	Flexible with superior elongation, resists hydrolysis, UV stable, superior adhesion.	1 hr touch 24 hr recoat
Spectra-Tone Paint Corporation, #225 Zaptec HB Waterproofing Elastomeric Coating, 100% Acrylic Smooth Texture	FF	88	50	44-89	Interior/exterior masonry, stucco, cement block, hollow tile, split face block, cinder block, sandblasted block or concrete, construction grade plywood or siding and most porous substrates	Superior elongation, UV stable, superior adhesion, dirt pick-up resistance, highly resistant to alkali, salt, ozone, acid rain, and most common chemicals, mildew and fungus protection	1 hr touch 4 hr handle 24 hr recoat
Tamms Industries Baracade WB 244, Oligomeric Siloxane/silane	P	50	N/A	100-150	For concrete, horizontal and above-grade precast, poured-in-place, exposed aggregate, sidewalks, ramps, parking decks, bridge decks, floors	Ready to use, penetrating, water repellent, colorless, odorless, non-staining, non-yellowing, breathable, alkali resistant.	N/A

Tamms Industries Chemstop WB Regular, Siloxane/silane	P	25	N/A	80-150	This water repellent is formulated for use on dense surfaces, such as pre-cast or poured-in-place concrete.	Waterproofs concrete and masonry, water-based, VOC compliant, colorless, odorless, non-staining, non-yellowing.	N/A
TK Products (Sierra Corp), TK-1311 WB Silane Concentrate, Silicone Micro Emulsion based on Silane and Oligomeric Alkoxysilanes	P	59	6	150	Concrete	Seals and imparts water repellent to absorbent mineral building materials	N/A

N/A= Not Available

50

APPENDIX B

AQMD Point of Distribution Product Inventory Survey

Introduction

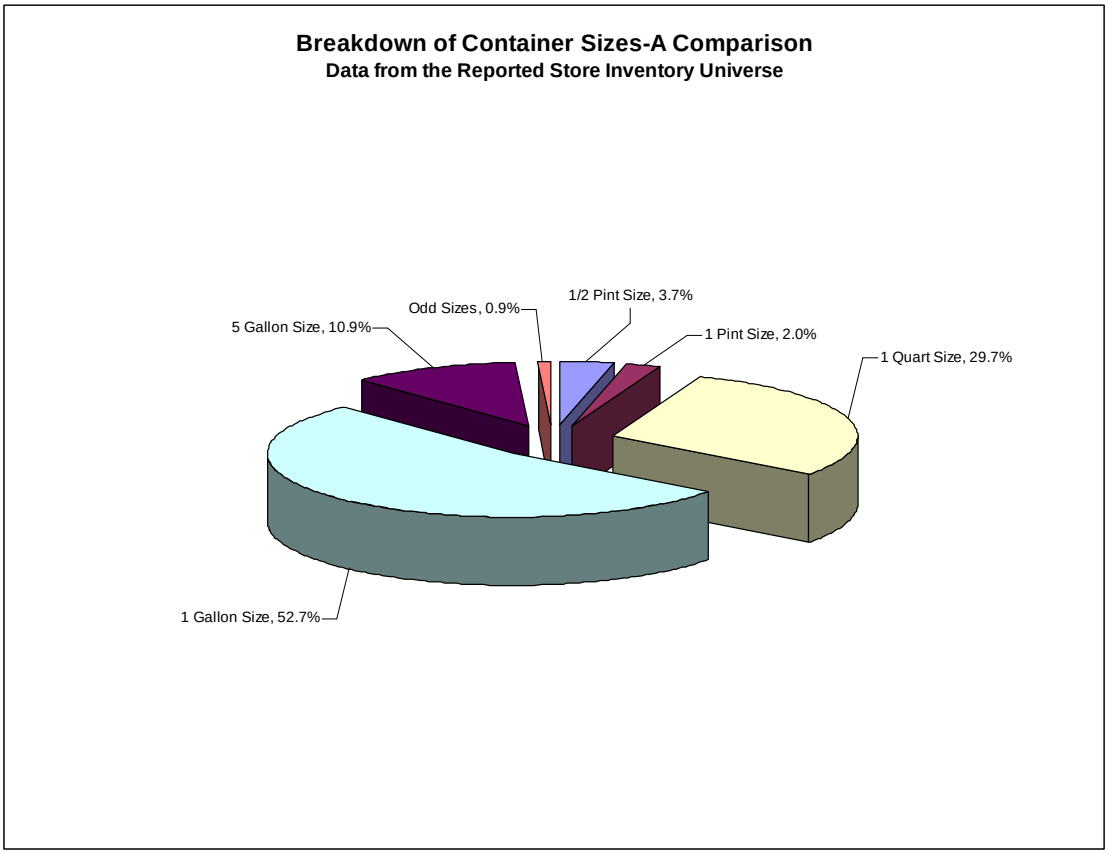
AQMD staff conducted a survey during the spring of 2004 by drafting an outreach letter and mailing it to the retail stores that sold architectural coatings within the AQMD jurisdiction. The main purpose for this survey was to obtain a snapshot of what was being stocked on the store shelves and the submitted data could then be used to provide a working model of what was actually sold in the AQMD jurisdiction. AQMD staff considers every coating sold as a coating that was applied within the AQMD jurisdiction. The outreach letter was mailed to 654 stores that operated inside the AQMD's jurisdiction. A mass mailing list of architectural coating retailers was generated by sourcing the yellow pages online, the internet web pages and recommendations from the retail outlet personnel. AQMD staff received 119 completed surveys and 12 surveys stating that no architectural coatings were sold, for a total of 131 responses. The combined responses amounted to 20% of the mass mailing list.

AQMD staff also benefited by conferring with many of the store owners, corporate executives and suppliers by informing them of the applicable VOC (Volatile Organic Compounds) limits under Rule 1113, Architectural Coatings and the VOC changes for various coating categories coming in 2006. Many of the individuals contacted were not aware of the upcoming VOC limitations for certain coating categories.

The submitted surveys were transcribed into a database (an Excel® spreadsheet) and each product was evaluated. The tremendous amount of data received was then examined for each coating and AQMD staff determined which coating category each coating would fit into. The data from the submitted surveys (the reported store inventory universe) shows 21,053 line items for all products obtained from the store surveys. This data is available electronically and was used to provide the working model for the sales of architectural coatings. All of the calculations conducted by AQMD staff were based on the reported data obtained from the submitted surveys.

Container Sizes

The data can be analyzed several ways. The first analysis was to determine how much was in inventory and in what size containers. This would provide a snap shot of which containers were the most popular sales items. Graph-1 shows how the various container sizes rank based on reported inventory. Note that the 1-gallon container size nets that largest slice of the pie at 52.7%. The second most popular container size was the 1-quart size which netted 29.7% of the pie.



Graph-1: A Breakdown of Container Sizes

Another analysis was to determine the inventory for each container category. Using the reported store inventory information, the 21,053 line items translated into 25,380 gallons of architectural products available for consumers at the time of the survey, which was further evaluated to contribute 22.3 tons of VOCs just from this survey alone. Table-1 shows a breakdown of all the products by container sizes and the ~~pollution impact~~total VOC emissions.

Table-1: ~~Pollution Impact~~VOC Emissions from Survey Paint Sales

Container Size	Total Gallons	Total VOC Emissions (lbs)	Total VOC Emissions (tons)
½ Pint {783 Items}	49	162.55	0.081
1 Pint {416 Items}	52	206.49	0.103
1 Quart {6,254 Items}	1,564	3,956.60	1.978
1 Gallon {11,099 Items}	11,099	21,473.34	10.737
5 gallon {2,297 Items}	11,485	17,032.08	8.516
Other Sizes (Lg) {113 Items}~~Other Sizes (Sm) {86 Items}~~	1,128	1,750.07	0.875
Other Sizes (Sm) {86 Items} ~~Other Sizes (Lg) {113 Items}~~	4	8.60	0.004

Grand Total	**{21,053 Items}**	**25,380**	**44,589.7**	**22.3**

Coating Categories

The 21,053 line items of the reported store ~~invnetory~~ inventory universe can be broken down by identifying which coating category in Rule 1113 they fall into. AQMD Staff segregated the 21,053 line items into the most appropriate coating category by using the reported data for each reported product. The reported VOC information and the Table of Standards in Rule 1113 were used to determine if the coatings were either within allowable rule limitations or exceeding the limits. In addition, this data was also used to determine if any of the reported coatings would meet the future compliance limits. Table-2 shows an overview of how the various coating categories compare to each other.

Table-2: Reported Store Inventory Universe by Coating Category

Category	Total Number Of Coatings	Number Of Coatings Meeting Current Limits	Number of Coatings Exceeding Current Limits	Number of Coatings Meeting Future Limits
Concrete-Curing Compounds	26	26	0	26
Clear Wood Finish	891	508	383	84
Clear Wood Finish-Brushing Lacquers	2	0	2	0
Clear Wood Finish-Lacquers	73	1	72	1
Clear Wood Finish-Sanding Sealers	78	20	58	2
Clear Wood Finish-Varnishes	407	218	189	22
Flats	3,006	1,955	1,180	107
Faux/Japans	283	240	43	240
Floor Coatings	1,252	350	903	269
Industrial Maintenance Coatings	103	0	103	0
Industrial Maintenance-High Temp	11	3	8	3
Industrial Maintenance-Zinc Rich	2	0	2	0
Mastic Coatings	13	13	0	13
Multi-Colored Coatings	30	30	0	30
Metallic Pigmented Coatings	38	22	16	22
Non-Flats	7,042	3,875	3,167	142
Primers/Sealers/Undercoaters	2,136	1,146	990	233
Quick Dry-Enamels	49	7	42	0
Quick Dry-Primers/Sealers/Undercoaters	9	2	7	2
Roof Coatings	212	184	28	123
Roof Coatings-Aluminum	22	1	21	1
Rust Preventative Coatings	1,254	890	364	4
Shellac-Clear	66	62	4	62
Shellac-Pigmented	7	7	0	7

Specialty Primers	15	4	11	0
Swimming Pool Coatings	34	33	1	33
Stains	3,040	991	2,049	103
Traffic Coatings	244	187	57	187
Waterproofing Concrete Masonry Sealers	201	186	15	48
Wood Preservatives	211	200	11	200
Waterproofing Sealers	296	147	149	15

Further analysis of Table-2 can be ascertained by breaking down the largest invnetory products per coating category. Table-3 is an abbreviated table of Table-2 intended to show the largest coating categories from the reported store inventory universe.

Table-3: The Top Ten Largest Coating Categories of the Store Inventory Universe

Category	Total Number of Coatings	Number of Coatings Meeting Current Limits	Number of Coatings Exceeding Current Limits	Number of Coatings Meeting Future Limits
Non-Flats	7,042	3,875	3,167	142
Stains	3,040	991	2,049	103
Flats	3,006	1,955	1,180	107
Primer/Sealer/Undercoaters	2,136	1,146	990	233
CWF-All	1,451	747	704	109
Rust Preventative Coatings	1,254	890	364	4
Floor Coatings	1,253	350	903	269

Table-4 shows the top ten coating categories with the largest percentage of products meeting the current limits. Table-2 was broken down to show the total number of coating products, those meeting current limits, those exceeding current limits as well as those coatings meeting future VOC limits specified in Rule 1113.

Table-4: Top ten most compliant coating categories of the Store Inventory Universe

Category	Total Number of Coatings	Number of Coatings Meeting Current Limits	% Coatings Meeting Current Limits	Number of Coatings Exceeding Current Limits	Number of Coatings Meeting Future Limits
Concrete-Curing Compounds	26	26	100%	0	26
Mastic Coatings	13	13	100%	0	13
Multi-Colored Coatings	30	30	100%	0	30

Shellac-Pigmented	7	7	100%	0	7
Swimming Pool Coatings	34	33	97%	1	33
Wood Preservatives	211	200	95%	11	200
Shellac-Clear	66	62	94%	4	62
Waterproofing Conc Mas Slrs	201	186	93%	15	48
Roof Coatings	212	184	87%	28	123
Faux Coatings	283	240	85%	43	240

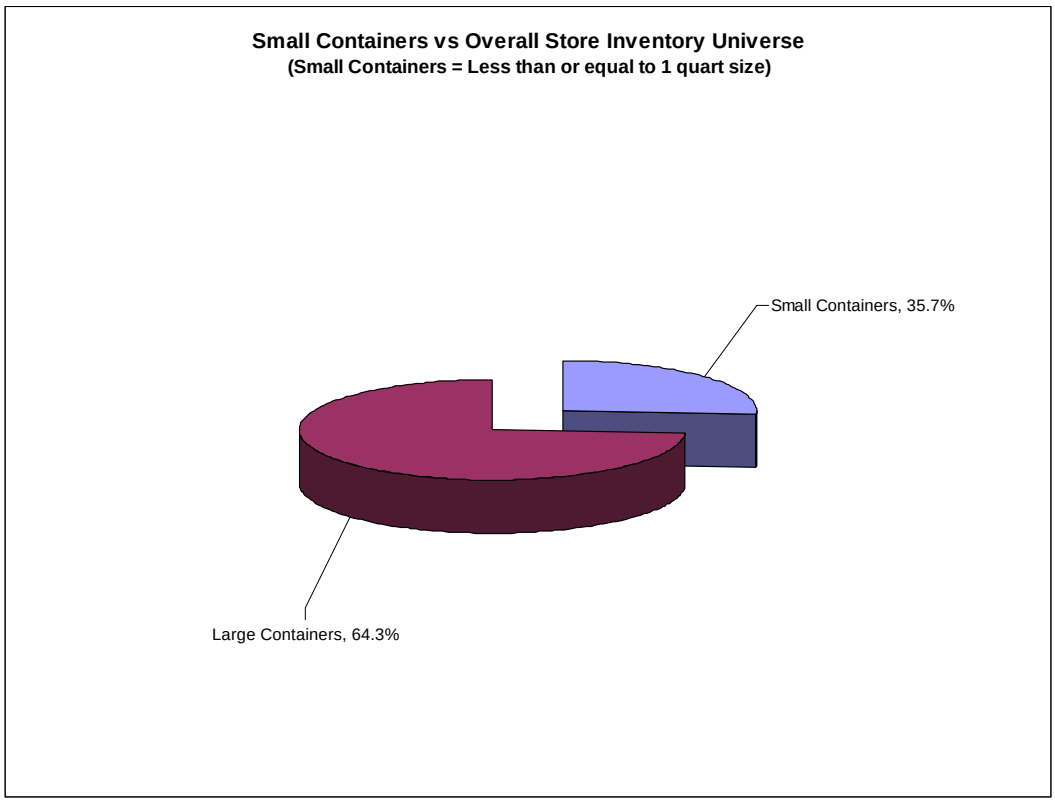
Table-5 shows the 10 coatingcategories with the smallest percentage of products meetingcurrent limits of the rule. Rule 1113 has provisions that allows for small container exemptions (products that are listed with AQMD Staff that are sold in 1-quart or less container sizes), a 3-year sell through provision, meaning that if a coating was manufactured before the current VOC limit (pursuant to the Table of Standards in Rule 1113) the product can be sold for up to 3 years, providing it does not exceed the previous VOC limit in the rule, and an Averaging Compliance Option (ACO) allowing the sale of specific non-compliant products offset by the sale of low-VOC products under an approved AQMD plan. This is based on each specific coating category, i.e. Non-flats, Stains, Flats, etc. Short of an actual physical inspection of each product listed, it would be very difficult to determine which of the products in Table-5 would qualify under the 3-year sell through sales provision or those that were part of an ACO Plan.

Table-5: Top ten least compliant coating categories of the Store Sales Universe

Category	Total Number Of Coatings	Number of Coatings Meeting Current Limits	% of Coatings Meeting Current Limits	Number of Coatings Exceeding Current Limits	Number of Coatings Meeting Future Limits
Clear Wood Finish-Brushing Lacquers	2	0	0%	2	0
Industrial Maintenance Coatings	103	0	0%	103	0
Industrial Maintenance Coatings –Zinc	2	0	0%	2	0
Clear Wood Finish-Lacquers	73	1	1%	72	1
Roof Coatings-Aluminum	22	1	5%	21	1
Quick Dry-Enamels	49	7	14%	42	0
Quick Dry-Primer/Sealer/Undercoaters	9	2	22%	7	2
Industrial Maintenance Coatings-Hi-temp	11	3	27%	8	3
Specialty Primers	15	4	27%	11	0
Floor Coatings	1,252	349	28%	903	269

Small Container Exemptions

Another analysis can be made by comparing the container sizes that qualify for the small container exemption in Rule 1113 to the reported store sales universe. The small container sizes range from half pint up to 1-quart sizes. Graph-2 shows how the small container sizes compared to the larger container sizes in the reported store inventory universe.



Graph-2: Small Container versus Report Store Inventory Universe

As was previously mentioned, Rule 1113 provides an exemption for architectural coatings that exceed the allowable VOC limit for container sizes 1-quart and less, providing the manufacturer notifies AQMD and lists the products with the AQMD. AQMD staff has prepared small container exemption records for years: 2000, 2001, 2002, 2003 and 2004. The data obtained from the reported store inventory universe has shown that small container sizes commonly sold are half pint, 1-pint and 1-quart sizes. In fact the 1-quart size containers alone account for 83.1% of the small container inventory and the small container inventory inclusive accounts for 35.7% of the reported store inventory universe.

AQMD staff also segregated the inventory into half paint, 1 pint and 1 quart container sizes and then eliminated any duplication of products. The duplication of products was created by several stores with the same product in the same size container. The breakdown of the small container sizes is shown in Table-6

Table-6: Small Container Sizes (1 quart or less)

Size Container	No of Products	% of Small Container
Half Pint	783	10.4%
1-Pint	416	5.5%
1-Quart	6,254	83.1%
Odd Size (Sm)	72	1.0%

Total	7,525	100%

AQMD staff determined that several of the store products fell into the small container exemption. Note that the forth column in Table-7 is called out as undeclared. This means that AQMD staff was not able to determine if the product was small container exempted and thus it was declared "undeclared". Table-7 shows a breakdown of the small containers that were identified as small container exempted to those that were not qualified for the small container exemption.

Table-7: Small Container Exempted Products versus Non-Exempted Products

Size Container	SC Exempted	SC Non-Exempted	Undeclared	% SC Exempted
Half Pint	183	211	0	87%
1-Pint	86	209	32	41%
1-Quart	572	2,114	126	27%

SC-Small Container

Super-compliant Coatings

There were 520 products sold that met the Super-compliant requirement, or 2.5% of the reported store inventory universe. Upon review of the 2005 Rule 1113 staff report, there are 33 Super-compliant product manufacturers that manufacture products that are available for sale and use in the AQMD jurisdiction. Table-8 shows the Super-compliant products that were reported by the stores. Table-3 was further broken down to show which coating categories meet the criteria for a Super-compliant coating and Table-8 is the result. A Super-compliant coating is defined as a coating that meets future VOC limits and contains less then 10 g/l (grams per liter) of VOC. Table-8 shows a list of Super-compliant coatings that were drawn from the reported store sales universe. Note that the total VOC emissions for all 520 Super-compliant products only amounted to 10.2 pounds of VOC.

Table-8: Super-Compliant Coatings from the Reported Inventory Universe

Coating Category	Number of Products	1 Pint Size	1 Qt Size	1 Gal Size	1.5 Gal Size	2 Gal Size	3 Gal Size	4 Gal Size	5 Gal Size	10 Gal Size	55 Gal Size	Total Amount of Product Sold (gal)	VOC Emission (lbs)
CCC	2	0	0	1	0	0	0	0	1	0	0	1.0	0.0
Flat	17	0	5	8	0	1	0	0	3	0	0	11.3	0.5
Faux	7	0	2	2	0	1	0	0	2	0	0	4.5	0.1
Floor	241	0	0	78	7	42	1	0	113	0	0	175.5	1.4
IMC-HT	1	0	0	1	0	0	0	0	0	0	0	1.0	0.0
MC	3	0	0	3	0	0	0	0	0	0	0	3.0	0.0
NF	26	15	8	0	0	0	0	0	3	0	0	3.9	0.5
PSU	52	2	5	24	3	2	1	0	14	1	0	737.0	1.2
QD-PSU	2	0	1	1	0	0	0	0	0	0	0	1.3	0.0
RC	78	0	19	45	0	0	0	0	14	0	0	49.8	0.8
Stain	42	0	0	36	0	0	0	0	6	0	0	36.0	2.5
TC	33	0	5	7	0	0	0	0	21	0	0	8.3	3.0
WCMS	15	0	1	4	0	0	0	3	6	0	1	71.3	0.2
WS	1	0	0	1	0	0	0	0	0	0	0	1.0	0.0
TOTAL	520	17	46	211	10	46	2	3	183	1	1	1104.6	10.2

Coating Category	Number of Products	1 Pint Size	1 Qt Size	1 Gal Size	1.5 Gal Size	2 Gal Size	3 Gal Size	4 Gal Size	5 Gal Size	10 Gal Size	55 Gal Size	Total Amount of Product Sold (gal)	VOC Emission (lbs)
CCC	2	0	0	1	0	0	0	0	1	0	0	6.0	0.0
F	17	0	5	8	0	1	0	0	3	0	0	26.3	0.5
Faux	7	0	2	2	0	1	0	0	2	0	0	14.5	0.1
Floor	241	0	0	78	7	42	1	0	113	0	0	740.5	1.4
IMC-HT	1	0	0	1	0	0	0	0	0	0	0	1.0	0.0
MC	3	0	0	3	0	0	0	0	0	0	0	3.0	0.0
NF	26	15	8	0	0	0	0	0	3	0	0	18.9	0.5
PSU	52	2	5	24	3	2	1	0	14	1	0	117.0	1.2
QD-PSU	2	0	1	1	0	0	0	0	0	0	0	1.3	0.0
RC	78	0	19	45	0	0	0	0	14	0	0	119.8	0.8
Stain	42	0	0	36	0	0	0	0	6	0	0	66.0	2.5
TC	33	0	5	7	0	0	0	0	21	0	0	113.3	3.0
WCMS	15	0	1	4	0	0	0	3	6	0	1	101.3	0.2
WS	1	0	0	1	0	0	0	0	0	0	0	1.0	0.0
TOTAL	**520**	**17**	**46**	**211**	**10**	**46**	**2**	**3**	**183**	**1**	**1**	**1329.6**	**10.2**

3-Year Sell Through

There are several products of various coating categories that were observed to be exceeding current limits in Rule 1113. There is a 3-year sell through clause in Rule 1113 that does allow a higher VOC product to be sold and used in the AQMD jurisdiction provided that the product was manufactured prior to that date of the VOC limitation for its category and does not exceed the previous VOC limitation for its category. The 3-year sell through exemption can be broken down into two categories; those that are no longer protected under the 3-year sell through because of time expiration and those that may still fall into the 3-year sell through category. Table-9 shows which coating categories fall into the two groups.

Table-9: Coating Categories and the 3-year sell through

Coating Category	Prior VOC Limit Date (VOC)	Current VOC Limit Date (VOC)	3 Year Sell Through Protected?
Bond Breakers	11/08/96 (350 gpl)	07/09/04 (350 gpl)	Possible
Clear Wood Finishes-Lacquers	01/01/98 (680 gpl)	01/01/05 (275 gpl)	Possible
Clear Wood Finishes-Varnishes	11/08/96 (350 gpl)	07/09/04 (350 gpl)	Possible
Clear Wood Finishes-Sanding Sealers	11/08/96 (350 gpl)	07/09/04 (350 gpl)	Possible
Clear Wood Finishes-Lacquers	01/01/98 (550 gpl)	01/01/05 (275 gpl)	Possible
Clear Brushing Lacquer	11/08/96 (680 gpl)	07/09/04 (680 gpl)	Possible
Concrete-Curing Compounds	11/08/96 (350 gpl)	07/09/04 (350 gpl)	Possible
Dry-Fog Coatings	11/08/96 (~~350~~ 400 gpl)	07/09/04 (400 gpl)	Possible
Fire-Proofing Exterior Coatings	11/08/96 (450 gpl)	01/01/99 (350 gpl)	Expired

Flat Coatings	11/08/96 (250 gpl)	07/01/01 (100 gpl)	Expired
Floor Coatings	11/08/96 (420 gpl)	01/01/03 (100 gpl)	Possible
Graphic Arts (sign) Coatings	11/08/96 (350 gpl)	07/09/04 (350 gpl)	Possible
High Temperature IM Coatings	11/08/96 (420 gpl)	01/01/03 (420 gpl)	Possible
Zinc-Rich IM Coatings	11/08/96 (420 gpl)	01/01/03 (340 gpl)	Possible
Industrial Maintenance Coatings	11/08/96 (420 gpl)	01/01/04 (250 gpl)	Possible
Japans/Faux Finishes Coatings	11/08/96 (700 gpl)	01/01/99 (350 gpl)	Expired
Magnesite Cement Coatings	11/08/96 (600 gpl)	01/01/99 (450 gpl)	Expired
Mastic Coatings	11/08/96 (300 gpl)	07/09/04 (300 gpl)	Possible
Metallic Pigmented Coatings	11/08/96 (500 gpl)	07/09/04 (500 gpl)	Possible
Multi-Color Coatings	11/08/96 (420 gpl)	01/01/98 (250 gpl)	Expired
Non-Flat Coatings	01/01/03 (150 gpl)	07/09/04 (150 gpl)	Possible
Pigmented Lacquers	11/08/96 (680 gpl)	01/01/98 (550 gpl)	Expired
Coating Category	**Prior VOC Limit Date (VOC)**	**Current VOC Limit Date (VOC)**	**3 Year Sell Through Protected?**
Pre-Treatment Wash Primers	11/08/96 (780 gpl)	01/01/03 (420 gpl)	Possible
Primers, Sealers Undercoaters	11/08/96 (350 gpl)	01/01/03 (200 gpl)	Possible
Quick-Dry Enamel Coatings	11/08/96 (400 gpl)	01/01/03 (250 gpl)	Possible
Quick-Dry Primers/ Sealers/Undercoaters	11/08/96 (680 gpl)	01/01/03 (200 gpl)	Possible
Recycled Coatings	11/08/96 (No Limit)	01/01/03 (250 gpl)	Possible
Roof Coatings	01/01/03 (250 gpl)	01/01/05 (50 gpl)	Possible
Roof Coatings, Aluminum	11/08/96 (500 gpl)	01/01/05 (100 gpl)	Possible
Roof Primers Bituminous	11/08/96 (350 gpl)	01/01/03 (350 gpl)	Possible
Rust Preventative Coatings	11/08/96 (420 gpl)	01/01/03 (400 gpl)	Possible
Shellac Clear	11/08/96 (730 gpl)	07/09/04 (730 gpl)	Possible
Shellac Pigmented	11/08/96 (550 gpl)	07/09/04 (550 gpl)	Possible
Specialty Primers	11/08/96 (350 gpl)	07/09/04 (350 gpl)	Possible
Stains	11/08/96 (350 gpl)	01/01/03 (250 gpl)	Possible
Stains Interior	11/08/96 (250 gpl)	07/09/04 (250 gpl)	Possible
Swimming Pool Coatings, Repair Only	11/08/96 (650 gpl)	01/01/03 (340 gpl)	Possible
Swimming Pool Coatings, Other	11/08/96 (340 gpl)	07/09/04 (340 gpl)	Possible
Traffic Coatings	11/08/96 (250 gpl)	01/01/98 (150 gpl)	Expired

Waterproofing Sealers	11/08/96 (400 gpl)	01/01/03 (250 gpl)	Possible
Waterproofing Concrete/ Masonry Sealers	11/08/96 (400 gpl)	07/09/04 (~~350~~ 400 gpl)	Possible
Wood Preservatives Below-Ground	11/08/96 (350 gpl)	07/09/04 (350 gpl)	Possible
Wood Preservatives Other	11/08/96 (350 gpl)	07/09/04 (350 gpl)	Possible

Table current as of July 09, 2004 Rule 1113 Amendments, Table of Standards

Table-10 is a refined version of Table-9 and shows the coating categories where the previous VOC limitation has expired and the product should not be sold in the South Coast Air Basin. These are products that do not meet the 3-year sell through. For example, any flat coating sold that is greater than 100 g/l of VOC is in violation of Rule 1113. There are 1,180 flat coatings that exceeded this VOC limit in the reported store inventory universe.

Table-10: Coating Categories no longer protected by the 3-year sell through

Coating Category	Prior VOC Limit Date (VOC)	Current VOC Limit Date (VOC)	3 Year Sell Through Protected?	% of Store Inventory Universe
Flat Coatings	11/08/96 (250 gpl)	07/01/01 (100 gpl)	Expired	14.3%
Japans/Faux Finish Coatings	11/08/96 (700 gpl)	01/01/99 (350 gpl)	Expired	1.3%
Traffic Coatings	11/08/96 (250 gpl)	01/01/98 (150 gpl)	Expired	1.2%
Multi-Color Coatings	11/08/96 (420 gpl)	01/01/98 (250 gpl)	Expired	0.1%
Fire-Proofing Exterior Coatings	11/08/96 (450 gpl)	01/01/99 (350 gpl)	Expired	0%
Magnesite Cement Coatings	11/08/96 (600 gpl)	01/01/99 (450 gpl)	Expired	0%
Pigmented Lacquers	11/08/96 (680 gpl)	01/01/98 (550 gpl)	Expired	0%

Conclusions

There were 131 retail stores that responded to the outreach survey and provided the District with their inventory information. This limited survey indicates that products meeting the 2006 VOC limits in Rule 1113 for many categories are currently available and being sold to consumers. However, the survey also indicated that there is a significant number of products exceeding current rule limits. AQMD staff intends to follow up with the distributors that did not respond to the survey as well as evaluate the compliance status of those products reported as exceeding current applicable standards and take appropriate enforcement action.

APPENDIX C

UMR Coatings Institute Architectural and Industrial Maintenance Coatings Assessment

Architectural & Industrial Maintenance Coatings Technology Assessment

Phase I Report

#P2004-24

Michael R. Van De Mark, Director
UMR Coatings Institute
1870 Miner Circle, BOM #2
Rolla, Missouri 65409-1020
(573)341-4882
mvandema@umr.edu

April 8 2005

Executive Summary

Products Listing by Category

	Published VOC	Grouping	
Group 1:	**High Gloss Non-flats**		
Product A	242 g/L	> 50g/L	H
Product B	149 g/L	> 50g/L	H
Product C	47 g/L	≤ 50g/L	L
Product D	0 g/L	≤ 50g/L	L
Group 2:	**Med. Gloss Non-flats**		
Product E	150 g/L	> 50g/L	H
Product F	144 g/L	> 50g/L	H
Product G	0 g/L	≤ 50g/L	L
Product H	0 g/L	≤ 50g/L	L
Group 3:	**Low Gloss Non-flats**		
Product I	150 g/L	> 50g/L	H
Product J	112 g/L	> 50g/L	H
Product K	<50 g/L	≤ 50g/L	L
Product L	49 g/L	≤ 50g/L	L

Number of Products Tested by Published VOC Range

Category	Products >50g/L	Products ≤50g/L
High Gloss Non-flats	2	2
Medium Gloss Non-flats	2	2
Low Gloss Non-flats	2	2

Tests for General Properties Summary

Percent Nonvolatile Summary

	Published VOC	Grouping		Percent Nonvolatile Experimental
Group 1:	**High Gloss Non-flats**			
Product A	242 g/L	> 50g/L	H	42.72
Product B	149 g/L	> 50g/L	H	51.02
Product C	47 g/L	≤ 50g/L	L	49.75
Product D	0 g/L	≤ 50g/L	L	48.49
Group 2:	**Med. Gloss Non-flats**			
Product E	150 g/L	> 50g/L	H	46.11
Product F	144 g/L	> 50g/L	H	48.55
Product G	0 g/L	≤ 50g/L	L	52.34
Product H	0 g/L	≤ 50g/L	L	42.75
Group 3:	**Low Gloss Non-flats**			
Product I	150 g/L	> 50g/L	H	52.93
Product J	112 g/L	> 50g/L	H	49.26
Product K	<50 g/L	≤ 50g/L	L	52.23
Product L	49 g/L	≤ 50g/L	L	52.82

Stability Summary

	Grouping	Stormer (original)	Stormer (post-test)	Overall Character
Group 1:	**High Gloss Non-flats**			
Product A	H	74	Failure*	
Product B	H	103	93	8
Product C	L	109	89	8
Product D	L	104	Failure*	
Group 2:	**Med. Gloss Non-flats**			
Product E	H	106	99	7
Product F	H	103	94	6
Product G	L	108	103	6
Product H	L	113	105	6
Group 3:	**Low Gloss Non-flats**			
Product I	H	101	103	10-Good
Product J	H	94	99	7
Product K	L	106	113	7
Product L	L	95	Failure*	

*Mode of Failure – These received a rating of 0 denoting failure because of gellation

Stability Summary - Gloss Measurements

	Grouping	20°Mean	20 SD	60°Mean	60 SD	85°Mean	85 SD
Group 1:	**High Gloss Non-flats**						
Product A	H	Failure*					
Product B	H	23.9	0.2	63.7	0.2	92.9	0.4
Product C	L	68.3	0.6	85.2	0.2	95.4	1.4
Product D	L	Failure*					
Group 2:	**Med. Gloss Non-flats**						
Product E	H	8.5	0.2	45.3	0.4	84.3	1.2
Product F	H	2.4	0.1	22.2	0.2	83.5	1.4
Product G	L	2.4	0.1	20.6	0.2	51.7	0.2
Product H	L	4.7	0.2	31.2	0.2	79.5	0.6
Group 3:	**Low Gloss Non-flats**						
Product I	H	4.2	0.2	29.7	0.6	71.9	0.2
Product J	H	1.3	0.1	4.9	0.1	26.2	0.2
Product K	L	1.4	0.1	4.3	0.1	25.3	0.2
Product L	L	Failure*					

*No draw-downs were done of the failed paints

Stormer and Cone and Plate Viscosities Summary

	Grouping	Stormer (KU)		Cone and Plate (P)	
		Average	**Temp. (°C)**	**Average**	**Temp (°C)**
Group 1:	**High Gloss Non-flats**				
Product A	H	74	25	0.78	25
Product B	H	103	25	1.69	25
Product C	L	109	25	2.34	25
Product D	L	104	25	1.22	25
Group 2:	**Med. Gloss Non-flats**				
Product E	H	106	25	1.65	25
Product F	H	103	25	0.81	25
Product G	L	108	25	1.13	25
Product H	L	113	25	1.43	25
Group 3:	**Low Gloss Non-flats**				
Product I	H	101	25	1.14	25
Product J	H	94	25	1.25	25
Product K	L	106	25	1.1	25
Product L	L	95	25	1.01	25

Spindle = 3, Shear Rate = $12000s^{-1}$

Freeze-Thaw Resistance: Pass/Fail Summary

	Grouping	After 1 Cycle	After 3 Cycles	After 5 Cycles	After 8 Cycles
Group 1:	**High Gloss Non-flats**				
Product A	H	Pass	Fail	Fail	Fail
Product B	H	Pass	Pass	Pass	Pass
Product C	L	Pass	Pass	Pass	Pass
Product D	L	Fail	Fail	Fail	Fail
Group 2:	**Med. Gloss Non-flats**				
Product E	H	Pass	Pass	Pass	Pass
Product F	H	Pass	Pass	Pass	Pass
Product G	L	Pass	Pass	Pass	Pass
Product H	L	Pass	Fail	Fail	Fail
Group 3:	**Low Gloss Non-flats**				
Product I	H	Pass	Pass	Pass	Fail
Product J	H	Pass	Pass	Fail	Fail
Product K	L	Pass	Fail	Fail	Fail
Product L	L	Fail	Fail	Fail	Fail

Mechanical Dry Time Summary*

	Grouping	Set-Touch	Tack-Free	Dry-Hard	Dry-Through
Group 1:	**High Gloss Non-flats**				
Product A	H	4	12	17	176
Product B	H	10	13	63	122
Product C	L	2	22	179	>24 hrs
Product D	L	10	13	22	65
Group 2:	**Med. Gloss Non-flats**				
Product E	H	10	26	201	296
Product F	H	4	11	88	111
Product G	L	3	7	10	19
Product H	L	13	15	73	>24 hrs
Group 3:	**Low Gloss Non-flats**				
Product I	H	2	26	129	239
Product J	H	15	20	48	>24 hrs
Product K	L	5	9	88	139
Product L	L	2	6	13	53

*Average values; times in minutes; stylus diameter = 1mm; speed = 6 hours

Ambient Dry Time Summary*

	Grouping	Set-Touch	Dust-Free	Tack-Free	Dry-Hard	Dry-Through
Group 1:	**High Gloss Non-flats**					
Product A	H	20	24	44	56	61
Product B	H	26	31	35	132	165
Product C	L	43	66	>300	>500	Approx. 24 hours
Product D	L	25	31	35	68	80
Group 2:	**Med. Gloss Non-flats**					
Product E	H	16	27	83	171	209
Product F	H	21	34	86	157	167
Product G	L	28	32	36	48	60
Product H	L	40	44	46	160	> 5 days
Group 3:	**Low Gloss Non-flats**					
Product I	H	46	54	59	218	282
Product J	H	41	47	51	62	Approx.24hours
Product K	L	50	59	62	74	103
Product L	L	31	36	39	55	57

*Times are in minutes, and are the average of two samples

Gloss Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 1:	**High Gloss Non-flats**						
Product A	H	44.1	0.7	80.2	0.2	95.6	0.8
Product B	H	42.9	0.6	74.7	0.3	96.2	0.7
Product C	L	71.3	0.7	85.9	0.4	97.1	0.8
Product D	L	21.8	1.0	59	0.6	88.1	0.8
Group 2:	**Med. Gloss Non-flats**						
Product E	H	13.2	0.4	52.2	0.5	85.9	1.1
Product F	H	22.0	0.2	61.0	0.2	92.7	0.7
Product G	L	3.4	0.1	24.3	0.2	51.4	0.7
Product H	L	4.5	0.2	30.3	0.2	78.8	0.9
Group 3:	**Low Gloss Non-flats**						
Product I	H	5.1	0.2	32.5	0.4	71.5	0.5
Product J	H	1.4	0.1	6.1	0.1	26.2	0.4
Product K	L	1.4	0.1	5.6	0.1	26.5	0.2
Product L	L	1.4	0.1	4.9	0.1	14.6	0.2

*Average values

Hide Summary – Contrast Ratio*

	Grouping	3 mil #1	3 mil #2	2 mil #1	2 mil #2
Group 1:	**High Gloss Non-flats**				
Product A	H	0.96	0.96	0.96	0.96
Product B	H	0.98	0.98	0.98	0.98
Product C	L	0.97	0.97	0.97	0.97
Product D	L	0.97	0.97	0.96	0.97
Group 2:	**Med. Gloss Non-flats**				
Product E	H	0.98	0.98	0.98	0.98
Product F	H	0.98	0.98	0.98	0.98
Product G	L	0.97	0.97	0.97	0.96
Product H	L	0.96	0.96	0.96	0.96
Group 3:	**Low Gloss Non-flats**				
Product I	H	0.98	0.98	0.97	0.97
Product J	H	0.99	0.99	0.98	0.98
Product K	L	0.98	0.98	0.97	0.97
Product L	L	0.95	0.95	0.92	0.93

*Average values

Tests for Non-Flat Paints Summary

Scrub Resistance Summary*

	Grouping	Sample Average	Standard Average
Group 1:	**High Gloss Non-flats**		
Product A	H	265	121
Product B	H	368	121
Product C	L	653	120
Product D	L	218	120
Group 2:	**Med. Gloss Non-flats**		
Product E	H	1750	120
Product F	H	392	121
Product G	L	58	122
Product H	L	408	120
Group 3:	**Low Gloss Non-flats**		
Product I	H	1685	122
Product J	H	630	120
Product K	L	472	121
Product L	L	1265	120

*The standard is Sherwin Williams' Harmony

Stain Resistance – ΔE Summary*

	Grouping	Ketchup	Mustard	Wine	Carbon
Group 1:	**High Gloss Non-flats**				
Product A	H	0.60	0.49	0.28	0.58
Product B	H	0.35	0.10	0.18	0.20
Product C	L	0.72	0.98	0.81	1.54
Product D	L	0.46	0.45	0.31	18.13
Group 2:	**Med. Gloss Non-flats**				
Product E	H	0.38	0.49	4.11	1.32
Product F	H	0.62	0.86	0.62	1.36
Product G	L	0.49	1.77	0.50	0.20
Product H	L	0.59	0.75	3.03	17.18
Group 3:	**Low Gloss Non-flats**				
Product I	H	0.25	0.86	3.09	1.78
Product J	H	0.11	0.37	1.68	9.29
Product K	L	0.30	0.59	1.13	7.34
Product L	L	0.44	0.46	0.49	4.10

*Average values

Stain Resistance – Gloss Summary*

Washed Area (no stain)/ Washed Area – Ketchup							
	Grouping	**20° Mean**	**20° SD**	**60° Mean**	**60° SD**	**85° Mean**	**85° SD**
Group 1:	**High Gloss Non-flats**						
Product A	H	27.0/27.3	0.6/2.2	74.5/72.6	2.0/2.6	87.4/86.0	1.2/3.0
Product B	H	34.9/37.0	1.2/3.4	72.2/72.6	1.6/1.4	90.2/89.1	1.0/1.4
Product C	L	48.5/51.7	0.6/2.8	84.2/85.0	0.6/0.6	94.4/93.9	1.0/1.4
Product D	L	17.0/16.8	0.6/2.2	57.7/57.6	0.6/2.6	84.6/85.4	1.0/1.6
Group 2:	**Med. Gloss Non-flats**						
Product E	H	11.7/12.6	0.1/0.2	51.7/53.0	0.2/0.4	75.5/76.9	0.6/0.8
Product F	H	16.0/18.5	0.2/0.6	59.9/62.7	0.2/0.4	85.5/87.0	0.4/0.8
Product G	L	2.1/2.0	0.1/0.1	13.7/13.3	0.2/0.4	36.2/36.4	0.8/0.8
Product H	L	3.4/3.5	0.1/0.1	24.9/25.8	0.2/0.4	65.8/68.0	0.4/0.8
Group 3:	**Low Gloss Non-flats**						
Product I	H	3.9/4.2	0.1/0.1	29.6/31.1	0.4/0.4	67.9/70.7	0.8/0.4
Product J	H	1.5/1.5	0.1/0.1	6.5/6.5	0.1/0.2	28.8/31.3	0.2/0.8
Product K	L	1.5/1.6	0..1/0.1	6.5/6.6	0.2/0.1	28.0/29.6	0.4/0.6
Product L	L	1.5/1.5	0.1/0.1	5.5/6.1	0.1/0.1	17.7/20.6	0.2/0.6

*All values written as: left value = washed area (no stain), right value = stained area

Washed Area (no stain) / Washed Area – Mustard							
	Grouping	**20° Mean**	**20° SD**	**60° Mean**	**60° SD**	**85° Mean**	**85° SD**
Group 1:	**High Gloss Non-flats**						
Product A	H	26.6/25.9	1.0/2.0	75.4/73.1	2.4/2.0	84.0/84.9	1.4/0.6
Product B	H	31.7/31.3	0.8/1.4	70.7/69.6	0.8/0.6	89.6/88.6	1.0/1.6
Product C	L	45.3/47.1	0.4/2.4	83.6/83.2	0.6/1.0	92.8/93.9	0.2/1.4
Product D	L	17.6/20.8	0.2/1.6	57.1/58.9	0.4/2.4	84.6/84.6	0.6/0.6
Group 2:	**Med. Gloss Non-flats**						
Product E	H	11.5/13.0	0.1/0.4	51.1/53.6	0.2/0.4	75.7/77.6	0.8/0.8
Product F	H	17.1/18.8	0.6/0.6	61.5/61.7	0.6/0.6	86.1/87.7	0.8/0.6
Product G	L	2.4/2.1	0.2/0.2	17.1/14.6	1.0/0.8	44.8/47.2	2.0/4.0
Product H	L	3.4/3.5	0.1/0.1	24.6/25.9	0.1/0.4	65.6/67.5	0.4/0.8
Group 3:	**Low Gloss Non-flats**						
Product I	H	4.0/4.2	0.2/0.1	30.3/30.8	0.2/0.2	68.2/69.1	0.2/0.4
Product J	H	1.5/1.5	0.1/0.1	6.5/6.6	0.1/0.1	29.0/30.2	0.4/1.2
Product K	L	1.5/1.6	0.1/0.1	6.4/6.9	0.1/0.1	28.3/30.1	0.2/0.2
Product L	L	1.4/1.5	0.1/0.1	5.4/6.1	0.1/0.2	18.3/22.1	0.4/0.4

*All values written as: left value = washed area (no stain), right value = stained area

Washed Area (no stain) / Washed Area – Wine							
	Grouping	**20° Mean**	**20° SD**	**60° Mean**	**60° SD**	**85° Mean**	**85° SD**
Group 1:	**High Gloss Non-flats**						

Product A	H	27.9/28.1	0.6/2.2	76.8/76.3	0.4/2.6	83.4/82.3	1.8/2.4
Product B	H	31.2/33.1	0.8/1.0	69.7/70.7	0.8/0.4	87.4/88.9	1.6/0.6
Product C	L	46.5/49.9	0.6/1.8	83.6/83.9	0.6/0.8	92.5/94.5	0.2/0.8
Product D	L	18.8/20.4	0.2/1.8	58.9/60.8	0.2/2.0	83.8/85.0	0.6/0.8
Group 2:	**Med. Gloss Non-flats**						
Product E	H	12.7/12.8	0.2/0.4	53.0/53.1	0.2/0.6	76.8/77.2	0.8/1.0
Product F	H	18.7/20.8	0.2/0.8	62.1/63.7	0.2/0.4	87.6/88.8	0.4/0.8
Product G	L	2.0/2.0	0.2/0.1	14.2/13.1	1.6/1.0	41.3/42.2	0.4/2.8
Product H	L	3.3/3.3	0.1/0.2	24.4/25.1	0.2/0.4	64.9/66.3	0.6/0.4
Group 3:	**Low Gloss Non-flats**						
Product I	H	3.8/3.9	0.2/0.2	28.9/30.2	0.6/0.6	69.9/70.9	0.4/0.8
Product J	H	1.5/1.4	0.1/0.1	6.4/6.9	0.1/0.1	28.7/34.6	0.4/0.4
Product K	L	1.5/1.5	0.1/0.1	6.5/6.7	0.2/0.1	29.2/32.1	0.2/0.2
Product L	L	1.4/1.5	0.1/0.1	5.3/6.1	0.1/0.1	17.6/22.4	0.4/0.6

*All values written as: left value = washed area (no stain), right value = stained area

Washed Area (no stain) / Washed Area – Carbon Black							
	Group	**20° Mean**	**20° SD**	**60° Mean**	**60° SD**	**85° Mean**	**85° SD**
Group 1:	**High Gloss Non-flats**						
Product A	H	29.3/27.2	0.8/1.0	78.0/77.9	0.8/1.0	86.1/84.6	0.6/0.6
Product B	H	30.4/32.1	0.2/1.2	70.7/71.7	0.2/0.6	87.8/88.4	0.6/1.2
Product C	L	46.8/49.4	0.8/2.2	82.7/83.2	0.6/1.4	93.6/95.7	1.0/1.4
Product D	L	18.6/29.7	0.6/2.2	58.5/72.0	0.8/4.0	80.9/84.4	0.8/0.8
Group 2:	**Med. Gloss Non-flats**						
Product E	H	12.9/14.1	0.2/0.4	53.4/55.7	0.4/0.8	76.0/79.7	1.6/1.0
Product F	H	16.7/20.1	0.4/1.2	61.3/65.6	0.4/0.8	86.2/90.6	1.2/1.6
Product G	L	2.4/2.1	0.1/0.2	18.5/15.5	1.0/1.8	51.7/55.1	0.8/2.2
Product H	L	3.3/4.4	0.1/0.4	24.9/32.1	0.2/1.2	65.4/69.4	0.4/2.0
Group 3:	**Low Gloss Non-flats**						
Product I	H	4.0/4.3	0.1/0.2	29.5/32.1	0.4/1.2	68.0/72.4	0.6/0.6
Product J	H	1.4/1.2	0.1/0.1	6.3/7.1	0.1/0.2	28.0/32.8	0.4/0.4
Product K	L	1.5/1.3	0.1/0.1	6.3/6.5	0.2/0.2	29.1/31.8	0.6/0.4
Product L	L	1.4/1.3	0.1/0.1	5.2/5.4	0.1/0.1	17.2/20.2	0.2/0.6

*All values written as: left value = washed area (no stain), right value = stained area

Blocking Resistance Summary*

	Grouping	**Average**
Group 1:	**High Gloss Non-Flats**	
Product A	H	10
Product B	H	2
Product C	L	9
Product D	L	3
Group 2:	**Med. Gloss Non-Flats**	
Product E	H	5
Product F	H	7

Product G	L	10
Product H	L	6
Group 3:	**Low Gloss Non-Flats**	
Product I	H	9
Product J	H	9
Product K	L	9
Product L	L	10

*Average Values

Flow/Level and Sag Summary*

	Grouping	**Flow/Level**	**Sag**
Group 1:	**High Gloss Non-flats**		
Product A	H	4.7	10.7
Product B	H	6	7
Product C	L	6	6.3
Product D	L	6	7
Group 2:	**Med. Gloss Non-flats**		
Product E	H	5	12+
Product F	H	4	12+
Product G	L	5	10
Product H	L	0	12+
Group 3:	**Low Gloss Non-flats**		
Product I	H	4	12+
Product J	H	4.7	9
Product K	L	4	12+
Product L	L	0	12+

*Average values

QUV Summary – Color Change*

	Grouping	**ΔE, 200 Hours**	**ΔE, 400 Hours**	**ΔE, 600 Hours**	**ΔE, 800 Hours**	**ΔE, 1000 Hours**
Group 1:	**High Gloss Non-flats**					
Product A	H	0.48	0.47	0.40	0.49	0.72
Product B	H	0.67	0.82	0.71	0.88	0.71
Product C	L	0.37	0.39	0.53	0.67	0.68
Product D	L	0.76	0.66	0.73	0.88	0.85
Group 2:	**Med. Gloss Non-flats**					
Product E	H	0.50	0.55	0.43	0.45	0.37
Product F	H	0.33	0.31	0.30	0.19	0.24
Product G	L	0.58	0.80	0.93	1.15	1.15
Product H	L	0.20	0.25	0.19	0.19	0.28
Group 3:	**Low Gloss Non-flats**					
Product I	H	0.34	0.30	0.27	0.18	0.15
Product J	H	0.67	0.68	0.97	1.09	1.14

Product K	L	0.28	0.22	0.18	0.23	0.23
Product L	L	0.45	0.43	0.57	0.65	0.83

*Average values

QUV Summary – Gloss: 0 Hours / 1000 Hours*

	Group	20°Mean	20 SD	60°Mean	60 SD	85°Mean	85 SD
Group 1:	**High Gloss Non-flats**						
Product A	H	46.3/11.9	0.2/3.9	79.1/50.7	0.2/6.7	97.9/91.3	0.5/1.1
Product B	H	34.4/6.2	0.2/0.7	69.4/40.6	0.2/1.5	96.2/88.4	0.5/0.5
Product C	L	70.8/20.7	0.3/1.3	85.8/68.7	0.2/1.3	97.9/95.7	0.7/0.6
Product D	L	21.3/11.7	0.7/0.4	58.5/50.7	0.4/0.7	89.2/85.6	0.6/0.6
Group 2:	**Med. Gloss Non-flats**						
Product E	H	18.3/2.7	0.3/0.1	57.9/22.8	0.2/0.4	86.8/73.4	0.6/0.3
Product F	H	19.8/3.5	0.4/0.3	59.3/31.6	0.3/1.4	92.8/87.0	1.2/0.7
Product G	L	3.5/1.4	0.1/0.1	24.9/10.1	0.2/0.3	53.6/55.4	0.3/0.5
Product H	L	4.5/2.2	0.1/0.2	30.9/18.2	0.2/1.1	81.8/72.4	1.0/0.7
Group 3:	**Low Gloss Non-flats**						
Product I	H	3.8/2.2	0.1/0.1	27.6/19.9	0.2/0.6	73.4/72.9	0.6/0.5
Product J	H	1.4/1.2	0.1/0.1	5.5/2.6	0.1/0.1	27.7/15.1	0.3/0.3
Product K	L	1.5/1.3	0.1/0.1	5.7/2.6	0.1/0.1	28.0/20.1	0.5/0.4
Product L	L	1.4/1.3	0.1/0.1	4.5/4.9	0.1/0.3	13.9/28.1	0.2/0.3

*All values written as: left value = 0 Hours value, right value = 1000 Hours value

*All values are averages

Surface Tension Summary

	Grouping	Corrected Surface Tension*
Group 1:	**High Gloss Non-flats**	
Product A	H	7.72**
Product B	H	8.67**
Product C	L	8.38**
Product D	L	16.92**
Group 2:	**Med. Gloss Non-flats**	
Product E	H	10.47**
Product F	H	13.85**
Product G	L	16.06
Product H	L	30.97
Group 3:	**Low Gloss Non-flats**	
Product I	H	23.01
Product J	H	25.85
Product K	L	28.77
Product L	L	26.87

*Surface tension measurements were corrected in accordance with the ASTM procedure using the tables published by Harkins, W.D., and Jordan, H.F., in "A Method for Determination of Surface and Interfacial Tension from the Maximum Pull on a Ring," Published in *Journal of American Chemical Society* Vol 52, 1930, p. 1751.

**One or more values of the three averaged values were outside of the original published table range. The published table data was plotted using Excel and fitted with a logarithmic fit with equation: $y = -0.0661 \ln(x) + 0.9351$; where y = correction factor, and $x = (R^3)/V$ value. For this line fit, $R^2 = 0.9998$.

Task 1 - Testing Protocol

Tests for General Properties of all paints

Property	Standard	Number of Replicates	Substrate	Film Thickness/ Bar Type
Percent Solids	ASTM D2369-04	3	N/A	N/A
Stability	ASTM D1849-95	1	N/A	3mil/Bird bar
Stormer Viscosity	ASTM D562-01	2	N/A	N/A
Cone and Plate Viscosity	ASTM D4287-00	2	N/A	N/A
Freeze-Thaw Resistance	ASTM D2243-95	3	N/A	3 mil/Bird bar
Dry Time - Mechanical	ASTM D5895-03	2	Glass	3mil Cube Applicator
Dry Time	ASTM D1640-03	2	Glass	3mil/Bird bar
Gloss	ASTM D523-89	2	Leneta Card 1-B	3mil/Bird bar
Hide	Spectrophotometer	4	Leneta Card 1-B	3mil/Bird bar 2mil/Bird bar

Tests for Non-flat Paints

Property	Standard	Number of Replicates	Substrate	Film Thickness/ Bar type
Scrub Resistance	ASTM D2486-00	2	Plastic	7 mil/Dow bar
Stain Resistance	ASTM D4828 mod.	4	Plastic	7 mil/Dow bar
Blocking Resistance	ASTM D4946-89	3	Leneta Card 2-C	3 mil/Bird bar
Flow & Leveling	ASTM D4062-99	3	Leneta Card 1-B	NPCA Bar
Sag	ASTM D4400-99	3	Leneta Card 1-B	Anti-Sag meter
QUV	ASTM D4587-01	3	Aluminum	#44 Wire Wound
Surface Tension	ASTM D1331-89	3	N/A	N/A

Performance of Testing

Tests for General Properties of All Paints

Percent Solids – ASTM D2369 is used.

Stability – ASTM D1849 is used with one sample of each being kept at 125°F for 30 days, followed by evaluation as indicated in the standard. Gloss measurements will also be taken of the samples during evaluation.

Stormer Viscosity – ASTM D562, method B, is used and provides a digital readout in KU.

Cone & Plate Viscosity – ASTM D4287 is used with the Brookfield CAP2000 model viscometer, using a number 3 spindle and a shear rate of $1200s^{-1}$.

Freeze-Thaw Resistance – ASTM D2243 is used for the water-borne paints for three samples of each with the paints applied to black and white Leneta charts after one, three, five, and eight cycles. A cycle is defined according to the ASTM method.

Dry Time – Mechanical Recorder – ASTM D5895 is used to determine dry time with a mechanical straight line drying time recorder.

Dry-Time – ASTM D1640 is used to determine dry time at room temperature.

Gloss – ASTM D523 is used with a BYK-Gardner micro-TRI-gloss meter calibrated just prior to use.

Hide – For dry hide and gloss, a three-mil Bird bar was used to apply paint to two black and white Leneta charts. Also, for hide, a two-mil Bird bar was used to apply paint to two black and white Leneta charts. The color was measured using a Minolta CM-2002 spectrophotometer and the CIE XYZ value for Y was recorded. The Y values over the white section and the black section were used to calculate dry hide. Due to Beer's and Lambert's Law, hide increases as film thickness increases. Hide also increases as concentration of hiding pigments increases.

Tests for Non-flat Paints

Scrub Resistance – Test method B of ASTM D2486 is used with a new brush to insure correct data. Sherwin Williams' Harmony is used as the standard.

Stain Resistance – ASTM D4828 is modified for this test. This method is actually a washability test and provides information about the changes which occur as a result of sponge cleaning a stained area rather than the paint's likelihood of resisting a stain. To better determine the paint's resistance to staining, the paint is applied to four plastic panels and allowed to dry for 7 days as described in the ASTM method. Color is measured on each panel using a Minolta CM-2002 spectrophotometer and the CIE XYZ

values are recorded. Four staining materials, ketchup, mustard, wine and carbon black, are applied with each panel having three one-inch stripes that are half an inch apart of one stain resulting in three stripes per stain, and one stain per panel. The materials are left on the panels for 24 hours and then rinsed with de-ionized water and washed for 100 cycles with non-abrasive cleaner and a sponge according to the ASTM method. The panel is patted dry with paper towels to remove standing water, and is then allowed to air dry for one day. Then, color measurements are taken of the stripes with CIE XYZ values and ΔE values recorded. Gloss measurements are also taken of a section of the washed area that is unstained and of the washed area that is stained so that any damage done by the washing itself is accounted for and not contributed to the staining medium.

Blocking Resistance – ASTM D4946 is used. Careful attention can produce reproducible results but this is a somewhat subjective test. It was performed after 7 days as suggested by the ASTM to allow more coalescence.

Flow & Leveling – ASTM D4062 is used. This is an old ASTM method that is analgous to the New York Society for Paint Technology "Official Digest" No. 44 Vol. 32, No. 430, p. 1435. The NYPC Level Blade is used.

Sag – ASTM D4400 is used. A Leneta anti-sag bar is used to apply paint to a black and white Leneta chart. This bar deposits strips of paint from 3 to 12 mils thick approximately ½" wide. The chart is immediately lifted to a vertical position with the 12 mil thick strip at the bottom. Evaluation is based upon how much the strips flow into the strips below.

QUV – ASTM D4587 is used. The aluminum panels are subjected to UV and condensation cycles alternating every four hours. Every 200 hours total time, the panels are evaluated for gloss and color change and are rotated according to the standard used. The total time used is 1000 hours.

Surface Tension – ASTM D1331 is the standard used. The maximum surface tension reached is reported as the length of the lamella, a useful indicator for the stabilization of foam.

Test Results

Tests for General Properties of All Paints

Percent Solids

	Pub. VOC	Grouping		3 Replicates Each						
Group 1:	**High Gloss Nonflats**			**W1**	**W2**	**SA**	**V (%vol)**	**AVG V**	**N (%NV)**	**AVG N**
Product A	242 g/L	> 50g/L	H	1.5049	1.7054	0.4704	57.38	57.28	42.62	42.72
	Replicate 2			1.5056	1.721	0.5046	57.31	----------	42.69	-------
	Replicate 3			1.5012	1.7186	0.5072	57.14	----------	42.86	-------
Product B	149 g/L	> 50g/L	H	1.5022	1.7292	0.4467	49.18	48.98	50.82	51.02
	Replicate 2			1.5017	1.7414	0.469	48.89	----------	51.11	-------
	Replicate 3			1.5046	1.7596	0.4987	48.87	----------	51.13	-------
Product C	47 g/L	≤ 50g/L	L	1.5069	1.7288	0.4465	50.30	50.25	49.70	49.75
	Replicate 2			1.512	1.7508	0.4796	50.21	----------	49.79	-------
	Replicate 3			1.4772	1.7031	0.454	50.24	----------	49.76	-------
Product D	0 g/L	≤ 50g/L	L	1.4778	1.7004	0.4599	51.60	51.51	48.40	48.49
	Replicate 2			1.4755	1.7178	0.4989	51.43	----------	48.57	-------
	Replicate 3			1.4739	1.6937	0.4533	51.51	----------	48.49	-------
Group 2:	**Med. Gloss Nonflats**			----------	----------	----------	----------	----------	----------	-------
Product E	150 g/L	> 50g/L	H	1.476	1.7173	0.5223	53.80	53.89	46.20	46.11
	Replicate 2			1.4693	1.6953	0.4915	54.02	----------	45.98	-------
	Replicate 3			1.4743	1.7142	0.5199	53.86	----------	46.14	-------
Product F	144 g/L	> 50g/L	H	1.4812	1.7131	0.4793	51.62	51.45	48.38	48.55
	Replicate 2			1.4792	1.7247	0.5038	51.27	----------	48.73	-------
	Replicate 3			1.4725	1.7311	0.5328	51.46	----------	48.54	-------
Product G	0 g/L	≤ 50g/L	L	1.4878	1.7435	0.4879	47.59	47.66	52.41	52.34
	Replicate 2			1.4886	2.1911	1.3444	47.75	----------	52.25	-------
	Replicate 3			1.484	1.7474	0.503	47.63	----------	52.37	------
Product H	0 g/L	≤ 50g/L	L	1.481	1.7088	0.5328	57.24	57.25	42.76	42.75
	Replicate 2			1.4833	1.6982	0.5027	57.25	----------	42.75	-------
	Replicate 3			1.4835	1.7058	0.5201	57.26	----------	42.74	-------
Group 3:	**Low Gloss Nonflats**			----------	----------	----------	----------	----------	----------	-------
Product I	150 g/L	> 50g/L	H	1.4849	1.7452	0.4921	47.10	47.07	52.90	52.93
	Replicate 2			1.4821	1.7432	0.4954	47.30	----------	52.70	-------
	Replicate 3			1.4817	1.748	0.5006	46.80	----------	53.20	-------
Product J	112 g/L	> 50g/L	H	1.4792	1.7354	0.521	50.83	50.74	49.17	49.26
	Replicate 2			1.4809	1.7239	0.493	50.71	----------	49.29	-------
	Replicate 3			1.4778	1.7325	0.5164	50.68	----------	49.32	-------
Product K	<50 g/L	≤ 50g/L	L	1.4781	1.7511	0.523	47.80	47.77	52.20	52.23
	Replicate 2			1.4823	1.7403	0.4944	47.82	----------	52.18	-------
	Replicate 3			1.4794	1.7472	0.5119	47.69	---------- ---	52.31	------- -------
Product L	49 g/L	≤ 50g/L	L	1.4838	1.7422	0.4893	47.19	47.18	52.81	52.82
	Replicate 2			1.4837	1.7717	0.5451	47.17	----------	52.83	-------
	Replicate 3			1.4829	1.7747	0.5524	47.18	----------	52.82	-------

Stability

	Pub. VOC		Pre	Storage	Post	Skin/Corr/	Rigidity	Stormer		Overall
Group 1:	**HighGloss**		**Weight**	**Time**	**Weight**	**Press**	**Low.Layer**	**Viscosity**	**Temp**	**Character**
Product A	242 g/L	H	631.2g	30 days	631.2	Failure				
Product B	149 g/L	H	644.4	30 days	644.3	8	10	93	25℃	8
Product C	47 g/L	L	623.1	30 days	623	10	10	89	25℃	8
Product D	0 g/L	L	635.7	30 days	635.6	Failure				
Group 2:	**Med.Gloss**		----------	----------	----------	----------	----------	----------	--------	----------
Product E	150 g/L	H	645	30 days	645	6	6	99	25℃	7
Product F	144 g/L	H	658	30 days	658	8	6	94	25℃	6
Product G	0 g/L	L	709.8	30 days	709.8	8	6	103	25℃	6
Product H	0 g/L	L	643.7	30 days	643.7	8	6	105	25℃	6
Group 3:	**LowGloss**		----------	----------	---------	----------	----------	----------	--------	----------
Product I	150 g/L	H	685.9	30 days	685.9	10	8	103	25℃	10
Product J	112 g/L	H	683.4	30 days	683.4	8	8	99	25℃	7
Product K	<50 g/L	L	715.1	30 days	715.1	8	6	113	25°C	7
Product L	49 g/L	L	684	30 days	684	Failure				

Stability – Gloss Measurements

	Pub. VOC		Gloss (5 readings per replicate)					
Group 1:	**HighGloss**		**20℃Mean**	**20℃SD**	**60℃Mean**	**60℃SD**	**85℃Mean**	**85℃SD**
Product A	242 g/L	H	Failure					
Product B	149 g/L	H	23.9	0.2	63.7	0.2	92.9	0.4
Product C	47 g/L	L	68.3	0.6	85.2	0.2	95.4	1.4
Product D	0 g/L	L	Failure					
Group 2:	**Med.Gloss**		----------	--------	----------	--------	----------	--------
Product E	150 g/L	H	8.5	0.2	45.3	0.4	84.3	1.2
Product F	144 g/L	H	2.4	0.1	22.2	0.2	83.5	1.4
Product G	0 g/L	L	2.4	0.1	20.6	0.2	51.7	0.2
Product H	0 g/L	L	4.7	0.2	31.2	0.2	79.5	0.6
Group 3:	**LowGloss**		----------	--------	----------	--------	----------	--------
Product I	150 g/L	H	4.2	0.2	29.7	0.6	71.9	0.2
Product J	112 g/L	H	1.3	0.1	4.9	0.1	26.2	0.2
Product K	<50 g/L	L	1.4	0.1	4.3	0.1	25.3	0.2
Product L	49 g/L	L	Failure					

Stormer Viscosity and Cone and Plate Viscosity

	VOC	Grouping		Stormer (KU)					Cone and Plate (P)				
Group 1:	**HighGloss Non-flats**			**1**	**Temp (℃)**	**2**	**Temp (℃)**	**Avg**	**1**	**Temp (℃)**	**2**	**Temp (℃)**	**Avg**
Product A	242 g/L	> 50g/L	H	74	25	74	25	74	0.78	25	0.78	25	0.8
Product B	149 g/L	> 50g/L	H	103	25	103	25	103	1.69	25	1.69	25	1.7
Product C	47 g/L	≤ 50g/L	L	109	25	109	25	109	2.34	25	2.34	25	2.3
Product D	0 g/L	≤ 50g/L	L	104	25	104	25	104	1.22	25	1.22	25	1.2
Group 2:	**Med.Gloss Non-flats**			-----	--------	-----	--------	-----	-----	--------	-----	--------	-----
Product E	150 g/L	> 50g/L	H	106	25	106	25	106	1.65	25	1.65	25	1.7
Product F	144 g/L	> 50g/L	H	103	25	103	25	103	0.81	25	0.81	25	0.8
Product G	0 g/L	≤ 50g/L	L	108	25	108	25	108	1.13	25	1.13	25	1.1
Product H	0 g/L	≤ 50g/L	L	113	25	113	25	113	1.43	25	1.43	25	1.4
Group 3:	**Low Gloss Non-flats**			-----	--------	-----	--------	-----	-----	--------	-----	--------	-----
Product I	150 g/L	> 50g/L	H	101	25	101	25	101	1.14	25	1.14	25	1.1
Product J	112 g/L	> 50g/L	H	94	25	94	25	94	1.25	25	1.25	25	1.3
Product K	<50 g/L	≤ 50g/L	L	106	25	106	25	106	1.1	25	1.1	25	1.1
Product L	49 g/L	≤ 50g/L	L	95	25	95	25	95	1.01	25	1.01	25	1

Freeze-Thaw Resistance

	Pub.VOC	Original	After 1 Cycle				After 3 Cycles				After 5 Cycles				After 8 Cycles			
Group 1:	**HighGloss**	**Stormer**	**S/G/C**	**Stormer**	**Temp**	**Comp**	**S/G/C**	**Stormer**	**Temp**	**Comp**	**S/G/C**	**Stormer**	**Temp**	**Comp**	**S/G/C**	**Stormer**	**Temp**	**Comp**
Product A	242 g/L	74	4	81	25	4	Failure				----------				----------			
Can 2		74	4	81	25	4	Failure				----------				----------			
Can 3		74	4	80	25	4	Failure				----------				----------			
Product B	149 g/L	103	10	106	25	10	10	121	25	10	8	130	25	8	8	138	25	8
Can 2		103	10	106	25	10	10	121	25	10	8	130	25	8	8	138	25	8
Can 3		103	10	106	25	10	10	121	25	10	8	130	25	8	8	138	25	8
Product C	47 g/L	109	10	113	25	10	10	114	25	10	10	117	25	10	10	120	25	10
Can 2		109	10	113	25	10	10	114	25	10	10	117	25	10	10	120	25	10
Can 3		109	10	113	25	10	10	114	25	10	10	117	25	10	10	120	25	10
Product D	0 g/L	104	Failure				----------				----------				----------			
Can 2		104	Failure				----------				----------				----------			
Can 3		104	Failure				----------				----------				----------			
Group 2:	**Med.Gloss**		--------	----------	-------	-----	--------	----------	--------	--------	--------	----------	--------	--------	-----	---------	---------	--------
Product E	150 g/L	106	4	127	25	4	8	114	25	8	8	111	25	8	8	106	25	8
Can 2		106	4	127	25	4	8	114	25	8	8	111	25	8	8	106	25	8
Can 3		106	4	127	25	4	8	114	25	8	8	111	25	8	8	106	25	8
Product F	144 g/L	103	10	106	25	10	10	106	25	10	10	112	25	10	10	121	25	10
Can 2		103	10	106	25	10	10	106	25	10	10	112	25	10	10	121	25	10
Can 3		103	10	106	25	10	10	106	25	10	10	112	25	10	10	121	25	10
Product G	0 g/L	108	10	114	25	10	10	113	25	10	10	108	25	10	10	115	25	10
Can 2		108	10	114	25	10	10	113	25	10	10	108	25	10	10	115	25	10
Can 3		108	10	114	25	10	10	113	25	10	10	108	25	10	10	115	25	10
Product H	0 g/L	113	10	112	25	10	Failure				----------				----------			
Can 2		113	10	112	25	10	Failure				----------				----------			
Can 3		113	10	112	25	10	Failure				----------				----------			
Group 3:	**LowGloss**		-------	----------	--------	---------	--------	----------	--------	---------	--------	----------	--------	---------	-----	----------	---------	---------
Product I	150 g/L	101	10	105	25	10	10	109	25	10	10	111	25	10	Failure			
Can 2		101	10	105	25	10	10	109	25	10	10	111	25	10	Failure			
Can 3		101	10	105	25	10	10	109	25	10	10	111	25	10	Failure			
Product J	112 g/L	94	10	101	25	10	10	102	25	10	Failure				----------			
Can 2		94	10	101	25	10	10	102	25	10	Failure				----------			
Can 3		94	10	101	25	10	10	102	25	10	Failure				----------			
Product K	<50 g/L	106	10	113	25	10	Failure				----------				----------			
Can 2		106	10	113	25	10	Failure				----------				----------			
Can 3		106	10	113	25	10	Failure				----------				----------			
Product L	49 g/L	95	8	122	25	8	Failure				----------				----------			

Can 2	95	8	122	25	8	Failure	----------	----------
Can 3	95	8	122	25	8	Failure	----------	----------

Freeze-Thaw - Gloss

	After 1 Cycle						After 3 Cycles						After 5 Cycles					
Group 1:	**20° M**	**20°S D**	**60° M**	**60°S D**	**85° M**	**85°S D**	**20° M**	**20°S D**	**60° M**	**60°S D**	**85°M**	**85° SD**	**20° M**	**20°S D**	**60° M**	**60°S D**	**85° M**	**85°S D**
Product A	43.2	1	79.2	0.6	89.3	1	Failure						----------					
Can 2	42.5	1.4	78.9	1	91.4	1.2	Failure						----------					
Can 3	31.5	2.6	69.9	2.4	83.5	1.4	Failure						----------					
Product B	39.1	0.4	73.3	0.2	93.5	1	39.9	0.4	73.5	0.2	92.9	0.6	42.3	0.4	74.7	0.2	93.1	0.6
Can 2	37.7	0.2	72.4	0.2	94.2	0.6	40.6	0.2	73.7	0.2	93.6	0.8	43.4	0.4	74.9	0.2	92.6	1.4
Can 3	37.6	0.2	72.4	0.1	93.3	0.2	38.1	0.2	72.7	0.2	92.9	0.6	41.3	0.4	74.2	0.2	92.4	0.8
Product C	67.1	0.6	86.5	0.2	96.4	0.6	68.4	0.6	86.4	0.2	101.7	1.2	66.7	1.2	86.4	0.4	99	1.4
Can 2	67.2	0.2	86.5	0.2	96.2	0.6	66.7	0.8	86.6	0.2	97.1	1	66.9	0.8	86.9	0.2	98	0.4
Can 3	65.9	0.4	86	0.2	96.3	0.4	68.3	1.4	87	0.8	96.5	1.6	65.5	0.6	86.7	0.6	97.8	0.6
Product D	Failure						----------						----------					
Can 2	Failure						----------						----------					
Can 3	Failure						----------						----------					
Group 2:	**-----**	**------**	**--------**	**-------**	**-------**	**-------**	**-------**	**-------**	**-------**	**-------**	**--------**	**----**	**-------**	**-------**	**-------**	**-------**	**-------**	**-------**
Product E	16.9	1.4	56.2	0.8	84.9	1	19.4	0.2	58.3	0.6	87.7	2.4	19.4	0.4	59.1	0.4	86.6	0.8
Can 2	17.9	1	56.4	0.6	86.9	2.6	19	0.2	58.5	0.6	85.5	1.2	19.8	0.2	59.4	0.1	86.7	0.6
Can 3	17.4	0.6	56.2	0.4	89.9	0.4	19	0.2	58.1	0.2	86	0.8	20.2	0.2	59.6	0.2	86.5	1.2
Product F	19	0.8	58.1	0.6	91.1	0.6	20.2	0.8	58.8	0.6	94.8	1	19.2	0.4	58.4	0.2	91.4	1
Can 2	19.9	0.4	58.6	0.4	90.3	1.4	19.4	0.4	58.7	0.2	90.4	1	18.9	0.4	58.2	0.6	90.7	1.2
Can 3	20.7	0.4	59.3	0.2	91.5	0.8	20	0.4	58.7	0.2	90.2	1.6	19.3	0.4	58.5	0.2	91.6	1.2
Product G	3.5	0.1	24.8	0.2	52.1	0.4	3.6	0.1	24.9	0.2	51.6	0.4	3.6	0.2	25.5	0.4	52.3	0.2
Can 2	3.3	0.1	23.8	0.2	50.6	0.4	3.5	0.1	24.6	0.2	51.1	0.2	3.8	0.1	26.2	0.2	53.1	0.4
Can 3	3.3	0.1	24.3	0.2	51.3	0.2	3.6	0.1	25.4	0.2	52.9	0.4	3.7	0.2	25.4	0.2	51.5	0.4
Product H	3.8	0.1	25.3	0.6	68	2.2	Failure						----------					
Can 2	4.4		29.6	0.2	77.4	0.6	Failure						----------					
Can 3	4.2		28.4	0.4	76.5	1.2	Failure						----------					
Group 3:	**-----**	**------**	**--------**	**-------**	**-------**	**-------**	**-------**	**-------**	**-------**	**-------**	**--------**	**----**	**-------**	**-------**	**-------**	**-------**	**-------**	**-------**
Product I	5.1	0.1	33.1	0.2	70.9	1	5.1	0.2	32.8	0.4	72.3	1.4	5.5	0.2	33.9	0.6	72.7	1
Can 2	5.2	0.1	32.9	0.6	72	0.6	5.2	0.1	32.8	0.6	72.7	0.6	5.3	0.1	33.5	0.2	71.7	0.6
Can 3	5.1	0.1	32.9	0.2	71.6	0.8	5	0.1	32.6	0.4	71.2	0.6	5.2	0.1	33.3	0.2	71.6	0.6
Product J	1.5	0.1	6.6	0.1	27.8	0.2	1.4	0.1	6.1	0.1	32.4	0.4	Failure					
Can 2	1.5	0.1	6.6	0.1	27.2	0.2	1.4	0.1	6.1	0.1	33.7	0.6	Failure					
Can 3	1.5	0.1	6.7	0.1	26.7	0.4	1.4	0.1	6.1	0.1	32	0.4	Failure					
Product K	1.6	0.1	5.8	0.1	26.3	0.2	Failure						----------					
Can 2	1.6	0.1	5.6	0.1	26.2	0.4	Failure						----------					

Can 3	1.6	0.1	5.8	0.1	26.2	0.4	Failure	----------
Product L	1.5	0.1	4.6	0.1	13.4	0.2	Failure	----------
Can 2	1.5	0.1	4.5	0.2	13.3	0.2	Failure	----------
Can 3	1.5	0.1	4.7	0.1	13.4	0.2	Failure	----------

Continued…	After 8 Cycles					
Group 1:	**20°M**	**20°SD**	**60°M**	**60°SD**	**85°M**	**85°SD**
Product A	----------					
Can 2	----------					
Can 3	----------					
Product B	42.4	0.4	74.3	0.2	93.1	0.6
Can 2	43.4	0.6	74.8	0.2	94.2	0.8
Can 3	42.2	0.4	74.3	0.4	96	1.2
Product C	70.6	0.8	87.1	0.4	96.5	1.2
Can 2	62.7	1	84.2	0.4	97.6	0.4
Can 3	69.7	0.6	86.9	0.2	95.7	0.6
Product D	----------					
Can 2	----------					
Can 3	----------					
Group 2:	**------**	**--------**	**---------**	**---------**	**--------**	**--------**
Product E	20.4	0.8	60.2	0.2	86.2	0.8
Can 2	20.1	0.6	58.3	1.2	87.5	2.6
Can 3	20.6	0.4	59	1.4	89.4	2.4
Product F	20.9	0.1	58.5	0.2	90.1	1.4
Can 2	21.4	0.8	59.2	0.2	90.1	1.2
Can 3	21.3	0.4	58.7	0.2	91.4	1
Product G	3.6	0.1	24.8	0.1	50.9	0.2
Can 2	3.6	0.1	25.3	0.1	52.8	0.6
Can 3	3.4	0.1	24.4	0.2	50.6	1.2
Product H	----------					
Can 2	----------					
Can 3	----------					
Group 3:	**------**	**--------**	**---------**	**---------**	**--------**	**--------**
Product I	Failure					
Can 2	Failure					
Can 3	Failure					
Product J	----------					
Can 2	----------					
Can 3	----------					
Product K	----------					
Can 2	----------					
Can 3	----------					

Product L	----------
Can 2	----------
Can 3	----------

Freeze-Thaw - Hide

	VOC	After 1 Cycle			After 3 Cycles			After 5 Cycles			After 8 Cycles		
Group 1:	**High**	**Y (Black)**	**Y (White)**	**Cont. Rat.**	**Y (Black)**	**Y (White)**	**Cont. Rat.**	**Y (Black)**	**Y (White)**	**Cont. Rat.**	**Y (Black)**	**Y (White)**	**Cont. Rat.**
Product A	242 g/L	86.83	88.97	0.98	Failure			----------			----------		
Can 2		86.61	89.04	0.97	Failure			----------			----------		
Can 3		86.94	89.09	0.98	Failure			----------			----------		
Product B	149 g/L	86.09	86.92	0.99	85.17	86.86	0.98	85.17	86.83	0.98	85.45	86.94	0.98
Can 2		86.05	86.95	0.99	86.40	87.10	0.99	86.24	87.13	0.99	86.42	87.18	0.99
Can 3		86.08	86.95	0.99	85.26	86.89	0.98	85.14	86.85	0.98	86.46	87.27	0.99
Product C	47 g/L	83.74	85.26	0.98	83.84	85.20	0.98	83.84	85.27	0.98	83.73	85.23	0.98
Can 2		83.87	85.33	0.98	82.52	84.87	0.97	83.90	85.22	0.98	82.21	85.06	0.97
Can 3		82.55	84.88	0.97	83.94	85.26	0.98	82.67	84.89	0.97	82.82	84.88	0.98
Product D	0 g/L	Failure			----------			----------			----------		
Can 2		Failure			----------			----------			----------		
Can 3		Failure			----------			----------			----------		
Group 2:	**Med**	----------	----------	---------	----------	----------	----------	---------	----------	----------	----------	----------	----------
Product E	150 g/L	85.51	86.95	0.98	86.40	87.21	0.99	85.24	86.80	0.98	86.19	87.06	0.99
Can 2		86.56	87.25	0.99	86.53	87.16	0.99	84.94	86.85	0.98	85.11	86.84	0.98
Can 3		86.22	87.20	0.99	85.20	86.92	0.98	86.27	87.20	0.99	86.15	87.08	0.99
Product F	144 g/L	85.65	86.85	0.99	86.43	87.07	0.99	86.40	87.07	0.99	86.25	86.98	0.99
Can 2		85.41	86.80	0.98	85.37	86.90	0.98	85.44	86.81	0.98	85.22	86.78	0.98
Can 3		86.45	87.18	0.99	86.36	87.05	0.99	85.62	86.94	0.98	86.15	87.00	0.99
Product G	0 g/L	88.76	90.55	0.98	86.88	89.94	0.97	87.92	90.54	0.97	86.59	89.84	0.96
Can 2		86.78	90.02	0.96	86.84	89.96	0.97	88.40	90.46	0.98	88.51	90.50	0.98
Can 3		88.69	90.65	0.98	88.52	90.56	0.98	86.96	89.85	0.97	86.57	89.80	0.96
Product H	0 g/L	84.37	87.61	0.96	Failure			----------			----------		
Can 2		86.04	87.96	0.98	Failure			----------			----------		
Can 3		84.42	87.65	0.96	Failure			----------			----------		
Group 3:	**Low**	----------	----------	---------	----------	----------	----------	---------	----------	----------	----------	----------	----------

Product I	150 g/L	87.52	90.09	0.97	89.14	90.71	0.98	87.33	89.92	0.97	Failure
Can 2		89.04	90.68	0.98	89.10	90.62	0.98	89.03	90.71	0.98	Failure
Can 3		87.50	90.11	0.97	87.27	89.86	0.97	87.81	90.04	0.98	Failure
Product J	112 g/L	84.07	84.72	0.99	82.89	84.66	0.98	Failure			----------
Can 2		83.10	84.68	0.98	83.87	84.70	0.99	Failure			----------
Can 3		83.37	84.73	0.98	82.99	84.68	0.98	Failure			----------
Product K	<50 g/L	89.83	91.36	0.98	Failure			----------			----------
Can 2		88.27	90.76	0.97	Failure			----------			----------
Can 3		89.95	91.35	0.98	Failure			----------			----------
Product L	49 g/L	85.82	89.65	0.96	Failure			----------			----------
Can 2		82.30	89.03	0.92	Failure			----------			----------
Can 3		85.51	89.76	0.95	Failure			----------			----------

Dry Time – Mechanical Recorder

	PubVOC	Grouping		Replicate 1				Replicate 2			
Group 1:	**High Gloss Non-flats**			**Stage1**	**Stage2**	**Stage3**	**Stage4**	**Stage1**	**Stage2**	**Stage3**	**Stage4**
Product A	242 g/L	> 50g/L	H	3	6	10	108	2	10	13	126
Time (min)				4.5	9	15	162	3	15	19.5	189
Average (min)				4	12	17	176	----------	----------	----------	----------
Product B	149 g/L	> 50g/L	H	7	9	40	82	6	8	44	81
Time				10.5	13.5	60	123	9	12	66	121.5
Average				10	13	63	122	----------	----------	----------	----------
Product C	47 g/L	≤ 50g/L	L	1	15	120	>300	1	14	118	>300
Time				1.5	22.5	180	>24 hrs	1.5	21	177	>24 hrs
Average				2	22	179	>24 hrs	----------	----------	----------	----------
Product D	0 g/L	≤ 50g/L	L	7	9	15	46	6	8	14	40
Time				10.5	13.5	22.5	69	9	12	21	60
Average				10	13	22	65	----------	----------	----------	----------
Group 2:	**Med. Gloss Non-flats**			----------	----------	----------	---------	----------	----------	----------	----------
Product E	150 g/L	> 50g/L	H	6	16	133	195	7	18	135	199
Time				9	24	199.5	292.5	10.5	27	202.5	298.5
Average				10	26	201	296	----------	----------	----------	----------
Product F	144 g/L	> 50g/L	H	3	8	60	73	2	7	57	75
Time				4.5	12	90	109.5	3	10.5	85.5	112.5
Average				4	11	88	111	----------	----------	----------	----------
Product G	0 g/L	≤ 50g/L	L	1	5	7	12	3	4	6	13
Time				1.5	7.5	10.5	18	4.5	6	9	19.5
Average				3	7	10	19	----------	----------	----------	----------
Product H	0 g/L	≤ 50g/L	L	8	10	50	>300	9	10	47	>300
Time				12	15	75	>24 hrs	13.5	15	70.5	>24 hrs
Average				13	15	73	>24 hrs	----------	----------	----------	----------
Group 3:	**Low Gloss Non-flats**			----------	----------	----------	----------	----------	----------	----------	----------
Product I	150 g/L	> 50g/L	H	1	18	87	160	1	16	85	158
Time				1.5	27	130.5	240	1.5	24	127.5	237
Average				2	26	129	239	----------	----------	----------	----------
Product J	112 g/L	> 50g/L	H	10	13	34	>300	10	13	30	>300
Time				15	19.5	51	>24 hrs	15	19.5	45	>24 hrs
Average				15	20	48	>24 hrs	----------	----------	----------	----------
Product K	<50 g/L	≤ 50g/L	L	2	5	62	91	5	7	55	94
Time				3	7.5	93	136.5	7.5	10.5	82.5	141
Average				5	9	88	139	----------	----------	----------	----------
Product L	49 g/L	≤ 50g/L	L	1	4	8	31	1	4	9	39
Time				1.5	6	12	46.5	1.5	6	13.5	58.5
Average				2	6	13	53	----------	----------	----------	----------

Dry-Time – Ambient

	Pub. VOC	Grouping		Times (min)				
Group 1:	**High Gloss Non-flats**			**Set-Touch**	**Dust-Free**	**Tack-Free**	**Dry-Hard**	**Dry-Through**
Product A	242 g/L	> 50g/L	H	20	24	44	56	60
Replicate 2				20	24	44	56	61
Average				20	24	44	56	61
Product B	149 g/L	> 50g/L	H	26	31	35	132	165
Replicate 2				26	31	35	132	165
Average				26	31	35	132	165
Product C	47 g/L	≤ 50g/L	L	46	68	> 300	> 500	approx. 24 hrs
Replicate 2				40	64	> 300	> 500	approx. 24 hrs
Average				43	66	> 300	> 500	approx. 24 hrs
Product D	0 g/L	≤ 50g/L	L	28	34	38	70	85
Replicate 2				22	28	32	65	75
Average				25	31	35	68	80
Group 2:	**Med. Gloss Non-flats**			----------	----------	----------	----------	----------
Product E	150 g/L	> 50g/L	H	16	27	80	171	189
Replicate 2				16	27	85	170	229
Average				16	27	83	171	209
Product F	144 g/L	> 50g/L	H	21	34	86	154	166
Replicate 2				21	34	85	159	167
Average				21	34	86	157	167
Product G	0 g/L	≤ 50g/L	L	27	31	36	47	59
Replicate 2				28	32	36	49	60
Average				28	32	36	48	60
Product H	0 g/L	≤ 50g/L	L	40	45	47	160	>5 Days
Replicate 2				40	43	45	160	>5 Days
Average				40	44	46	160	>5 Days
Group 3:	**Low Gloss Non-flats**			----------	----------	----------	----------	----------
Product I	150 g/L	> 50g/L	H	46	54	59	217	281
Replicate 2				46	54	59	218	282
Average				46	54	59	218	282
Product J	112 g/L	> 50g/L	H	47	50	55	62	approx. 24 hrs
Replicate 2				35	44	46	62	approx. 24 hrs
Average				41	47	51	62	approx. 24 hrs
Product K	<50 g/L	≤ 50g/L	L	50	60	63	74	102
Replicate 2				50	57	60	74	103
Average				50	59	62	74	103
Product L	49 g/L	≤ 50g/L	L	31	36	39	54	57
Replicate 2				31	36	39	55	57
Average				31	36	39	55	57

Gloss

	Pub. VOC	Grouping		Gloss (5 readings per replicate)					
Group 1:	**High Gloss Non-flats**			**20°Mean**	**20°Std. Dev.**	**60°Mean**	**60°Std. Dev.**	**85°Mean**	**85°Std. Dev.**
Product A	242 g/L	> 50g/L	H	44.1	0.4	80.2	0.2	95.6	0.8
Replicate 2				44.1	1	80.1	0.2	95.6	0.8
Average				44.1	0.7	80.2	0.2	95.6	0.8
Product B	149 g/L	> 50g/L	H	43.3	0.6	74.8	0.4	95.8	1
Replicate 2				42.5	0.6	74.6	0.2	96.5	0.4
Average				42.9	0.6	74.7	0.3	96.2	0.7
Product C	47 g/L	≤ 50g/L	L	71.3	0.8	86	0.4	96.7	0.6
Replicate 2				71.2	0.6	85.7	0.4	97.4	1
Average				71.3	0.7	85.9	0.4	97.1	0.8
Product D	0 g/L	≤ 50g/L	L	22	1.6	59.1	0.8	88.7	0.6
Replicate 2				21.6	0.4	58.8	0.4	87.4	1
Average				21.8	1.0	59.0	0.6	88.1	0.8
Group 2:	**Med. Gloss Non-flats**			----------	----------	----------	----------	----------	----------
Product E	150 g/L	> 50g/L	H	12.5	0.4	51.2	0.4	86.0	1.0
Replicate 2				13.9	0.4	53.2	0.6	85.8	1.2
Average				13.2	0.4	52.2	0.5	85.9	1.1
Product F	144 g/L	> 50g/L	H	22.2	0.2	61.3	0.2	92.5	1.0
Replicate 2				21.8	0.2	60.7	0.2	92.8	0.4
Average				22.0	0.2	61.0	0.2	92.7	0.7
Product G	0 g/L	≤ 50g/L	L	3.5	0.1	24.6	0.2	51.7	0.8
Replicate 2				3.3	0.1	24.0	0.2	51.1	0.6
Average				3.4	0.1	24.3	0.2	51.4	0.7
Product H	0 g/L	≤ 50g/L	L	4.5	0.2	30.5	0.2	78.9	1.0
Replicate 2				4.4	0.1	30.0	0.2	78.7	0.8
Average				4.5	0.2	30.3	0.2	78.8	0.9
Group 3:	**Low Gloss Non-flats**			----------	----------	----------	----------	----------	----------
Product I	150 g/L	> 50g/L	H	5.2	0.2	32.7	0.4	72.3	0.4
Replicate 2				5	0.2	32.3	0.4	70.7	0.6
Average				5.1	0.2	32.5	0.4	71.5	0.5
Product J	112 g/L	> 50g/L	H	1.4	0.1	6.1	0.1	26.4	0.1
Replicate 2				1.4	0.1	6	0.1	26	0.6
Average				1.4	0.1	6.1	0.1	26.2	0.4
Product K	<50 g/L	≤ 50g/L	L	1.4	0.1	5.6	0.1	26.6	0.2
Replicate 2				1.4	0.1	5.6	0.1	26.3	0.2
Average				1.4	0.1	5.6	0.1	26.5	0.2
Product L	49 g/L	≤ 50g/L	L	1.4	0.1	4.9	0.1	14.7	0.1
Replicate 2				1.4	0.1	4.9	0.1	14.5	0.2
Average				1.4	0.1	4.9	0.1	14.6	0.2

Hide

	VOC	Grouping		3mi l - 1			3mil - 2			2mil - 1			2mil - 2		
Group 1:	**H.G. Non-flats**			**Y (Black)**	**Y (White)**	**Cont. Rat.**	**Y (Black)**	**Y (White)**	**Cont. Rat.**	**Y (Black)**	**Y (White)**	**Cont. Rat.**	**Y (Black)**	**Y (White)**	**Cont. Rat.**
Product A	242 g/L	> 50g/L	H	84.57	88.17	0.96	84.53	88.08	0.96	84.15	87.86	0.96	84.3	87.97	0.96
Reading 2				84.66	88.13	0.96	84.52	88.16	0.96	84.12	88.04	0.96	84.27	88.16	0.96
Reading 3				84.92	88.18	0.96	84.86	88.11	0.96	84.37	87.8	0.96	84.5	87.93	0.96
Average				84.72	88.16	0.96	84.64	88.12	0.96	84.21	87.90	0.96	84.36	88.02	0.96
Product B	149 g/L	> 50g/L	H	84.87	86.65	0.98	84.92	86.67	0.98	84.68	86.62	0.98	84.95	86.68	0.98
Reading 2				84.78	86.66	0.98	84.81	86.66	0.98	84.79	86.62	0.98	84.85	86.75	0.98
Reading 3				84.84	86.69	0.98	84.92	86.7	0.98	84.76	86.65	0.98	85.08	86.74	0.98
Average				84.83	86.67	0.98	84.88	86.68	0.98	84.74	86.63	0.98	84.96	86.72	0.98
Product C	47 g/L	≤ 50g/L	L	82.86	85.17	0.97	83.03	85.31	0.97	82.98	85.16	0.97	82.94	85.23	0.97
Reading 2				82.84	85.15	0.97	82.97	85.32	0.97	82.82	85.18	0.97	82.93	85.28	0.97
Reading 3				82.93	85.22	0.97	82.95	85.28	0.97	82.92	85.21	0.97	82.84	85.25	0.97
Average				82.88	85.18	0.97	82.98	85.30	0.97	82.91	85.18	0.97	82.90	85.25	0.97
Product D	0 g/L	≤ 50g/L	L	86.28	89.21	0.97	86.09	89.31	0.96	85.72	89.06	0.96	86.17	89.15	0.97
Reading 2				86.18	89.33	0.96	86.12	89.21	0.97	85.85	89.12	0.96	86.11	89.22	0.97
Reading 3				86.19	89.23	0.97	86.33	89.13	0.97	86.08	89.16	0.97	86.23	89.18	0.97
Average				86.22	89.26	0.97	86.18	89.22	0.97	85.88	89.11	0.96	86.17	89.18	0.97
Group 2:	**M.G. Non-flats**			----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Product E	150 g/L	> 50g/L	H	85.98	87.64	0.98	85.64	87.53	0.98	85.66	87.53	0.98	85.27	87.30	0.98
Reading 2				85.90	87.60	0.98	85.58	87.44	0.98	85.72	87.47	0.98	85.33	87.34	0.98
Reading 3				85.88	87.62	0.98	85.69	87.49	0.98	85.64	87.53	0.98	85.22	87.30	0.98
Average				85.92	87.62	0.98	85.64	87.49	0.98	85.67	87.51	0.98	85.27	87.31	0.98
Product F	144 g/L	> 50g/L	H	85.60	87.13	0.98	85.79	87.22	0.98	85.44	87.02	0.98	85.41	87.07	0.98
Reading 2				85.47	87.10	0.98	85.64	87.18	0.98	85.46	87.11	0.98	85.47	87.10	0.98
Reading 3				85.59	87.14	0.98	85.66	87.18	0.98	85.55	87.12	0.98	85.52	87.15	0.98
Average				85.55	87.12	0.98	85.70	87.19	0.98	85.48	87.08	0.98	85.47	87.11	0.98
Product G	0 g/L	≤ 50g/L	L	87.03	90.07	0.97	87.10	90.15	0.97	87.00	89.97	0.97	86.73	90.00	0.96
Reading 2				87.18	90.06	0.97	86.83	90.10	0.96	86.96	90.10	0.97	86.76	90.07	0.96
Reading 3				87.08	90.06	0.97	87.17	90.08	0.97	87.09	90.08	0.97	86.74	89.99	0.96
Average				87.10	90.06	0.97	87.03	90.11	0.97	87.02	90.05	0.97	86.74	90.02	0.96
Product H	0 g/L	≤ 50g/L	L	84.42	87.60	0.96	84.27	87.69	0.96	84.19	87.49	0.96	84.02	87.59	0.96
Reading 2				84.11	87.62	0.96	84.07	87.56	0.96	84.07	87.60	0.96	84.08	87.55	0.96
Reading 3				84.23	87.60	0.96	84.27	87.64	0.96	84.18	87.51	0.96	84.02	87.63	0.96
Average				84.25	87.61	0.96	84.20	87.63	0.96	84.15	87.53	0.96	84.04	87.59	0.96

Group 3:	**L.G. Non-flats**			----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------
Product I	150 g/L	> 50g/L	H	88.92	90.6	0.98	88.88	90.64	0.98	87.07	90.07	0.97	87.34	89.97	0.97
Reading 2				88.96	90.65	0.98	89.04	90.63	0.98	87.08	90	0.97	87.17	90.05	0.97
Reading 3				88.93	90.62	0.98	89.05	90.66	0.98	87.09	90.15	0.97	87.44	90	0.97
Average				88.94	90.62	0.98	88.99	90.64	0.98	87.08	90.07	0.97	87.32	90.01	0.97
Product J	112 g/L	> 50g/L	H	83.96	84.77	0.99	84.05	84.78	0.99	82.82	84.73	0.98	83.05	84.76	0.98
Reading 2				84.02	84.79	0.99	83.96	84.83	0.99	83.1	84.73	0.98	82.96	84.76	0.98
Reading 3				84.02	84.78	0.99	84.03	84.82	0.99	83.07	84.74	0.98	83.08	84.76	0.98
Average				84.00	84.78	0.99	84.01	84.81	0.99	83.00	84.73	0.98	83.03	84.76	0.98
Product K	<50 g/L	≤ 50g/L	L	89.81	91.38	0.98	89.98	91.38	0.98	88.28	90.77	0.97	88.22	90.69	0.97
Reading 2				89.81	91.43	0.98	89.91	91.45	0.98	88.27	90.83	0.97	87.98	90.83	0.97
Reading 3				89.9	91.45	0.98	89.93	91.47	0.98	88.31	90.72	0.97	88.17	90.75	0.97
Average				89.84	91.42	0.98	89.94	91.43	0.98	88.29	90.77	0.97	88.12	90.76	0.97
Product L	49 g/L	≤ 50g/L	L	85.29	89.66	0.95	85.35	89.65	0.95	81.87	88.75	0.92	82.06	88.83	0.92
Reading 2				85.33	89.64	0.95	85.38	89.65	0.95	81.84	88.84	0.92	82.17	88.86	0.92
Reading 3				85.46	89.7	0.95	85.5	89.64	0.95	82.25	88.88	0.93	82.33	88.83	0.93
Average				85.36	89.67	0.95	85.41	89.65	0.95	81.99	88.82	0.92	82.19	88.84	0.93

Tests for Non-flat Paints

Scrub Resistance

	Pub. VOC	Grouping		Panel 1		Panel 2			
Group 1:	**High Gloss Non-flats**			**Sample**	**Standard**	**Sample**	**Standard**	**Sample Avg**	**Stand. Avg**
Product A	242 g/L	> 50g/L	H	260	121	270	121	265	121
Product B	149 g/L	> 50g/L	H	370	122	365	120	368	121
Product C	47 g/L	≤ 50g/L	L	650	120	656	120	653	120
Product D	0 g/L	≤ 50g/L	L	216	120	220	120	218	120
Group 2:	**Med. Gloss Non-flats**			----------	----------	----------	----------	----------	----------
Product E	150 g/L	> 50g/L	H	1760	120	1740	120	1750	120
Product F	144 g/L	> 50g/L	H	390	120	394	122	392	121
Product G	0 g/L	≤ 50g/L	L	55	122	60	122	58	122
Product H	0 g/L	≤ 50g/L	L	410	120	406	120	408	120
Group 3:	**Low Gloss Non-flats**			----------	----------	----------	----------	----------	----------
Product I	150 g/L	> 50g/L	H	1690	122	1680	122	1685	122
Product J	112 g/L	> 50g/L	H	626	120	634	120	630	120
Product K	<50 g/L	≤ 50g/L	L	474	122	470	120	472	121
Product L	49 g/L	≤ 50g/L	L	1270	120	1260	120	1265	120

Stain Resistance – Gloss

	Washed Area						Washed Area - Ketchup						Washed Area - Mustard					
Group 1:	**20° M**	**20° SD**	**60° M**	**60° SD**	**85° M**	**85° SD**	**20° M**	**20° SD**	**60° M**	**60° SD**	**85° M**	**85° SD**	**20° M**	**20° SD**	**60° M**	**60° SD**	**85° M**	**85° SD**
Product A	27	0.6	74.5	2	87.4	1.2	27.3	2.2	72.6	2.6	86	3	-------	-------	-------	-------	-------	--------
Panel 2	26.6	1	75.4	2.4	84	1.4	-------	----	-------	----	-------	----	25.9	2	73.1	2	84.9	0.6
Panel 3	27.9	0.6	76.8	0.4	83.4	1.8	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Panel 4	29.3	0.8	78	0.8	86.1	0.6	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Product B	34.9	1.2	72.2	1.6	90.2	1	37	3.4	72.6	1.4	89.1	1.4	-------	-------	-------	-------	-------	--------
Panel 2	31.7	0.8	70.7	0.8	89.6	1	-------	----	-------	----	------	----	31.3	1.4	69.6	0.6	88.6	1.6
Panel 3	31.2	0.8	69.7	0.8	87.4	1.6	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Panel 4	30.4	0.2	70.7	0.2	87.8	0.6	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Product C	48.5	0.6	84.2	0.6	94.4	1	51.7	2.8	85	0.6	93.9	1.4	-------	-------	-------	-------	-------	--------
Panel 2	45.3	0.4	83.6	0.6	92.8	0.2	-------	----	-------	----	-------	----	47.1	2.4	83.2	1	93.9	1.4
Panel 3	46.5	0.6	83.6	0.6	92.5	0.2	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Panel 4	46.8	0.8	82.7	0.6	93.6	1	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Product D	17	0.6	57.7	0.6	84.6	1	16.8	2.2	57.6	2.6	85.4	1.6	-------	-------	-------	-------	-------	--------
Panel 2	17.6	0.2	57.1	0.4	84.6	0.6	-------	----	-------	----	-------	----	20.8	1.6	58.9	2.4	84.6	0.6
Panel 3	18.8	0.2	58.9	0.2	83.8	0.6	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Panel 4	18.6	0.6	58.5	0.8	80.9	0.8	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Group 2:	-------	----	-------	----	-------	----	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Product E	11.7	0.1	51.7	0.2	75.5	0.6	12.6	0.2	53	0.4	76.9	0.8	-------	-------	-------	-------	-------	--------
Panel 2	11.5	0.1	51.1	0.2	75.7	0.8	-------	----	-------	----	-------	----	13	0.4	53.6	0.4	77.6	0.8
Panel 3	12.7	0.2	53	0.2	76.8	0.8	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Panel 4	12.9	0.2	53.4	0.4	76	1.6	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Product F	16	0.2	59.9	0.2	85.5	0.4	18.5	0.6	62.7	0.4	87	0.8	-------	-------	-------	-------	-------	--------
Panel 2	17.1	0.6	61.5	0.6	86.1	0.8	-------	----	-------	----	-------	----	18.8	0.6	61.7	0.6	87.7	0.6
Panel 3	18.7	0.2	62.1	0.2	87.6	0.4	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Panel 4	16.7	0.4	61.3	0.4	86.2	1.2	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Product G	2.1	0.1	13.7	0.2	36.2	0.8	2	0.1	13.3	0.4	36.4	0.8	-------	-------	-------	-------	-------	--------
Panel 2	2.4	0.2	17.1	1	44.8	2	-------	----	-------	----	-------	----	2.1	0.2	14.6	0.8	47.2	4
Panel 3	2	0.2	14.2	1.6	41.3	0.4	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Panel 4	2.4	0.1	18.5	1	51.7	0.8	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Product H	3.4	0.1	24.9	0.2	65.8	0.4	3.5	0.1	25.8	0.4	68	0.8	-------	-------	-------	-------	-------	--------
Panel 2	3.4	0.1	24.6	0.1	65.6	0.4	-------	----	-------	----	-------	----	3.5	0.1	25.9	0.4	67.5	0.8
Panel 3	3.3	0.1	24.4	0.2	64.9	0.6	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Panel 4	3.3	0.1	24.9	0.2	65.4	0.4	-------	----	-------	---	-------	----	-------	-------	-------	-------	-------	-------
Group 3:	-------	----	-------	----	-------	----	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Product I	3.9	0.1	29.6	0.4	67.9	0.8	4.2	0.1	31.1	0.4	70.7	0.4	-------	-------	-------	-------	-------	--------
Panel 2	4	0.2	30.3	0.2	68.2	0.2	-------	----	-------	----	-------	----	4.2	0.1	30.8	0.2	69.1	0.4
Panel 3	3.8	0.2	28.9	0.6	69.9	0.4	-------	--	-----	----	-------	----	-------	------	-----	-------	-------	--------

Panel 4	4	0.1	29.5	0.4	68	0.6	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Product J	1.5	0.1	6.5	0.1	28.8	0.2	1.5	0.1	6.5	0.2	31.3	0.8	-------	-------	-------	-------	-------	--------
Panel 2	1.5	0.1	6.5	0.1	29	0.4	-------	----	-------	----	-------	----	1.5	0.1	6.6	0.1	30.2	1.2
Panel 3	1.5	0.1	6.4	0.1	28.7	0.4	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Panel 4	1.4	0.1	6.3	0.1	28	0.4	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Continued..	**Washed Area**						**Washed Area - Ketchup**						**Washed Area - Mustard**					
	20° M	**20° SD**	**60° M**	**60° SD**	**85° M**	**85° SD**	**20° M**	**20° SD**	**60° M**	**60° SD**	**85° M**	**85° SD**	**20° M**	**20° SD**	**60° M**	**60° SD**	**85° M**	**85° SD**
Product K	1.5	0.1	6.5	0.2	28	0.4	1.6	0.1	6.6	0.1	29.6	0.6	-------	-------	-------	-------	-------	--------
Panel 2	1.5	0.1	6.4	0.1	28.3	0.2	-------	----	-------	----	-------	----	1.6	0.1	6.9	0.1	30.1	0.2
Panel 3	1.5	0.1	6.5	0.2	29.2	0.2	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Panel 4	1.5	0.1	6.3	0.2	29.1	0.6	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Product L	1.5	0.1	5.5	0.1	17.7	0.2	1.5	0.1	6.1	0.1	20.6	0.6	-------	-------	-------	-------	-------	--------
Panel 2	1.4	0.1	5.4	0.1	18.3	0.4	-------	----	-------	----	-------	----	1.5	0.1	6.1	0.2	22.1	0.4
Panel 3	1.4	0.1	5.3	0.1	17.6	0.4	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------
Panel 4	1.4	0.1	5.2	0.1	17.2	0.2	-------	----	-------	----	-------	----	-------	-------	-------	-------	-------	--------

Continued…	**Washed Area - Wine**						**Washed Area - Carbon**					
Group 1:	**20°M**	**20°SD**	**60°M**	**60°SD**	**85°M**	**85°SD**	**20°M**	**20°SD**	**60°M**	**60°SD**	**85°M**	**85°SD**
Product A	------	--------	---------	---------	--------	--------	------	--------	---------	--------	-------	--------
Panel 2	------	--------	--------	---------	--------	--------	------	--------	---------	--------	-------	--------
Panel 3	28.1	2.2	76.3	2.6	82.3	2.4	------	--------	---------	--------	-------	--------
Panel 4	------	--------	---------	---------	--------	--------	27.2	1	77.9	1	84.6	0.6
Product B	------	--------	---------	---------	--------	--------	------	--------	---------	-------	-------	--------
Panel 2	------	--------	---------	---------	--------	--------	------	--------	---------	--------	-------	--------
Panel 3	33.1	1	70.7	0.4	88.9	0.6	------	--------	---------	--------	-------	--------
Panel 4	------	--------	---------	---------	--------	--------	32.1	1.2	71.7	0.6	88.4	1.2
Product C	------	--------	---------	---------	--------	--------	------	--------	---------	--------	-------	--------
Panel 2	------	--------	---------	---------	--------	--------	------	-------	---------	--------	-------	--------
Panel 3	49.9	1.8	83.9	0.8	94.5	0.8	------	--------	---------	--------	-------	--------
Panel 4	-----	--------	---------	---------	--------	--------	49.4	2.2	83.2	1.4	95.7	1.4
Product D	------	--------	---------	---------	--------	--------	------	--------	---------	--------	-------	--------
Panel 2	------	--------	---------	---------	--------	--------	------	--------	---------	--------	-------	--------
Panel 3	20.4	1.8	60.8	2	85	0.8	------	--------	---------	--------	-------	--------
Panel 4	------	--------	---------	---------	--------	--------	29.7	2.2	72	4	84.4	0.8
Group 2:	------	--------	---------	---------	--------	--------	------	--------	---------	--------	-------	--------
Product E	------	--------	---------	---------	--------	--------	------	--------	---------	--------	-------	--------
Panel 2	------	--------	---------	---------	--------	--------	------	--------	---------	-------	-------	--------
Panel 3	12.8	0.4	53.1	0.6	77.2	1	------	--------	---------	--------	-------	--------
Panel 4	------	--------	---------	---------	--------	--------	14.1	0.4	55.7	0.8	79.7	1
Product F	------	--------	---------	---------	--------	-------	------	--------	---------	--------	-------	--------
Panel 2	------	--------	---------	---------	--------	--------	------	--------	---------	-------	-------	--------
Panel 3	20.8	0.8	63.7	0.4	88.8	0.8	------	--------	---------	--------	-------	--------

Panel 4	------	--------	---------	---------	--------	--------	20.1	1.2	65.6	0.8	90.6	1.6
Product G	------	--------	---------	---------	--------	--------	------	--------	---------	--------	-------	--------
Panel 2	------	--------	---------	---------	--------	--------	------	--------	---------	--------	-------	--------
Panel 3	2	0.1	13.1	1	42.2	2.8	------	--------	---------	--------	-------	--------
Panel 4	------	--------	--------	---------	--------	--------	2.1	0.2	15.5	1.8	55.1	2.2
Product H	------	--------	---------	---------	--------	--------	------	--------	---------	--------	-------	--------
Panel 2	------	--------	---------	---------	--------	--------	------	--------	---------	--------	-------	--------
Panel 3	3.3	0.2	25.1	0.4	66.3	0.4	------	--------	---------	--------	-------	--------
Panel 4	------	--------	---------	---------	--------	--------	4.4	0.4	32.1	1.2	69.4	2
Group 3:	------	--------	---------	---------	--------	--------	-----	--------	---------	--------	-------	--------
Product I	------	--------	---------	---------	--------	--------	------	--------	---------	--------	-------	--------
Panel 2	------	--------	---------	---------	--------	--------	------	--------	---------	-------	-------	--------
Panel 3	3.9	0.2	30.2	0.6	70.9	0.8	------	--------	---------	--------	-------	--------
Panel 4	------	--------	---------	---------	--------	--------	4.3	0.2	32.1	1.2	72.4	0.6
Product J	------	--------	---------	---------	--------	--------	------	--------	---------	--------	-------	--------
Panel 2	------	--------	---------	---------	--------	--------	------	--------	---------	--------	-------	--------
Panel 3	1.4	0.1	6.9	0.1	34.6	0.4	------	--------	---------	--------	-------	--------
Panel 4	------	--------	---------	---------	--------	--------	1.2	0.1	7.1	0.2	32.8	0.4
Continued…	**Washed Area - Wine**						**Washed Area - Carbon**					
Group 1:	**20°M**	**20°SD**	**60°M**	**60°SD**	**85°M**	**85°SD**	**20°M**	**20°SD**	**60°M**	**60°SD**	**85°M**	**85°SD**
Product K	------	--------	---------	---------	--------	--------	------	--------	---------	--------	-------	--------
Panel 2	------	--------	---------	---------	--------	--------	------	--------	---------	--------	-------	--------
Panel 3	1.5	0.1	6.7	0.1	32.1	0.2	------	-------	---------	--------	-------	--------
Panel 4	------	--------	---------	---------	--------	--------	1.3	0.1	6.5	0.2	31.8	0.4
Product L	------	--------	---------	---------	--------	--------	------	--------	---------	--------	-------	--------
Panel 2	------	--------	---------	---------	--------	--------	------	--------	---------	--------	-------	--------
Panel 3	1.5	0.1	6.1	0.1	22.4	0.6	------	--------	---------	--------	-------	--------
Panel 4	------	--------	---------	---------	--------	--------	1.3	0.1	5.4	0.1	20.2	0.6

Stain Resistance - Color

	Ketchup				Mustard				Wine				Carbon			
Group 1:	**X**	**Y**	**Z**	**ΔE**	**X**	**Y**	**Z**	**ΔE**	**X**	**Y**	**Z**	**ΔE**	**X**	**Y**	**Z**	**ΔE**
Product A	80.53	85.76	92.18	0.65	80.53	85.76	92.44	0.52	79.91	85.08	91.47	0.28	78.54	83.61	89.91	0.63
Stripe 2	80.37	85.59	91.93	0.63	80.49	85.72	92.31	0.54	80.11	85.3	91.63	0.34	78.76	83.84	89.99	0.63
Stripe 3	80.36	85.59	92.17	0.53	80.37	85.61	92.43	0.42	79.47	84.63	91.2	0.22	78.72	83.82	90.32	0.49
Standard	79.4	84.59	91.54	-------	79.47	84.66	91.58	-------	79.83	85.04	91.81	--------	79.62	84.81	91.69	-------
Average	80.42	85.65	92.09	0.60	80.46	85.70	92.39	0.49	79.83	85.00	91.43	0.28	78.67	83.76	90.07	0.58
Product B	80.53	85.52	91.42	0.46	80.68	85.68	91.96	0.1	80.58	85.59	91.71	0.17	79.89	84.86	91.21	0.3
Stripe 2	80.57	85.57	91.62	0.37	80.73	85.74	91.99	0.12	80.59	85.59	91.68	0.19	80.42	85.41	91.66	0.11
Stripe 3	80.36	85.37	91.61	0.21	80.53	85.54	91.9	0.07	80.33	85.33	91.53	0.19	80.12	85.1	91.48	0.2
Standard	80.26	85.26	91.79	-------	80.66	85.67	92.08	-------	80.7	85.71	92.07	--------	80.56	85.56	91.96	-------
Average	80.49	85.49	91.55	0.347	80.65	85.65	91.95	0.10	80.5	85.50	91.64	0.18	80.14	85.12	91.45	0.20
Product C	78.19	83.24	85.11	0.76	77.7	82.78	84.42	1.2	77.92	82.97	84.97	0.88	74.09	78.8	79.92	2.28
Stripe 2	78.03	83.08	84.9	0.8	77.9	82.97	84.8	1.07	77.9	82.96	84.95	0.88	76.27	81.17	82.7	1.29
Stripe 3	77.66	82.71	84.82	0.6	77.58	82.64	85	0.67	77.6	82.65	84.91	0.68	76.37	81.3	83.23	1.05
Standard	78.06	83.07	85.97	-------	77.65	82.63	85.9	-------	77.82	82.81	85.99	--------	78.16	83.15	86.07	-------
Average	77.96	83.01	84.94	0.72	77.73	82.80	84.74	0.98	77.81	82.86	84.94	0.813	75.58	80.42	81.95	1.54
Product D	82.53	87.78	93.12	0.59	82.19	87.44	92.42	0.59	82.18	87.41	92.7	0.39	51.49	54.32	53.95	16.4
Stripe 2	82.33	87.57	92.92	0.5	82.13	87.36	92.46	0.5	82.05	87.28	92.55	0.36	52.77	55.67	55.38	15.63
Stripe 3	81.9	87.12	92.6	0.29	81.76	86.98	92.34	0.26	81.68	86.89	92.32	0.17	42.54	44.73	43.57	22.36
Standard	81.49	86.63	92.36	-------	81.57	86.72	92.38	-------	81.57	86.73	92.34	--------	81.47	86.62	92.28	-------
Average	82.25	87.49	92.88	0.46	82.03	87.26	92.41	0.45	81.97	87.19	92.52	0.31	48.93	51.57	50.97	18.13
Group 2:	**--------**	**--------**	**-------**	**-------**	**--------**	**---------**	**--------**	**-------**	**--------**	**--------**	**---------**	**--------**	**---------**	**--------**	**--------**	**-------**
Product E	81.06	85.98	89.37	0.5	80.96	85.87	89.33	0.52	72.9	77.73	79.47	3.82	78.66	83.35	86.69	1.05
Stripe 2	81.02	85.94	89.51	0.37	80.82	85.74	89.23	0.48	72.24	77.06	78.84	4.09	78.6	83.28	86.61	1.08
Stripe 3	80.69	85.62	89.32	0.26	80.54	85.46	88.95	0.46	71.41	76.26	78.16	4.43	76.98	81.55	84.68	1.83
Standard	80.77	85.66	89.73	-------	80.61	85.53	89.68	-------	80.63	85.53	89.61	--------	80.69	85.59	89.57	-------
Average	80.92	85.85	89.4	0.38	80.77	85.69	89.17	0.49	72.18	77.02	78.82	4.11	78.08	82.73	85.99	1.32
Product F	80.71	85.89	89.66	0.74	80.67	85.82	89.27	0.96	80.38	85.47	89.18	0.63	77.46	82.3	85.75	1.63
Stripe 2	80.56	85.71	89.64	0.61	80.54	85.67	89.3	0.82	80.36	85.46	89.13	0.66	77.96	82.85	86.48	1.37
Stripe 3	80.37	85.53	89.65	0.5	80.29	85.42	89.09	0.79	80.17	85.26	89.09	0.58	78.39	83.33	87.31	1.09
Standard	80.59	85.61	90.33	-------	80.53	85.56	90.33	-------	80.81	85.84	90.42	--------	80.68	85.7	90.31	-------
Average	80.55	85.71	89.65	0.617	80.5	85.64	89.22	0.86	80.3	85.40	89.13	0.62	77.94	82.83	86.51	1.36
Product G	82.31	87.59	92.43	0.56	82.04	87.46	90.34	1.97	82.03	87.29	92.15	0.5	82.25	87.48	92.72	0.21
Stripe 2	82.39	87.67	92.57	0.53	81.96	87.38	90.37	1.89	81.88	87.14	91.99	0.5	82.37	87.61	92.83	0.23
Stripe 3	82.01	87.28	92.39	0.37	81.74	87.12	90.72	1.45	81.44	86.69	91.65	0.5	81.96	87.18	92.6	0.16
Standard	82.17	87.39	93.02	------	82.13	87.36	93.04	-------	82.13	87.36	92.94	--------	82.28	87.51	93.06	-------

Average	82.24	87.51	92.46	0.49	81.91	87.32	90.48	1.77	81.78	87.04	91.93	0.5	82.19	87.42	92.72	0.2
Product H	80.39	85.45	90.47	0.68	80.04	85.13	89.72	0.91	74.45	79.45	82.93	2.89	52.71	55.61	56.22	14.78
Stripe 2	80.42	85.47	90.55	0.65	80.04	85.13	89.82	0.85	73.34	78.25	81.37	3.46	45.81	48.24	48.07	19.23
Stripe 3	80.0	85.05	90.37	0.43	79.83	84.89	90.06	0.5	74.81	79.75	83.26	2.75	48.31	50.92	51.12	17.54
Standard	79.92	84.91	90.81	-------	79.99	84.99	90.86	-------	79.92	84.91	90.78	--------	79.83	84.83	90.75	-------
Average	80.27	85.32	90.46	0.59	79.97	85.05	89.87	0.75	74.2	79.15	82.52	3.03	48.94	51.59	51.80	17.18
Continued..	**Ketchup**				**Mustard**				**Wine**				**Carbon**			
	X	**Y**	**Z**	**ΔE**	**X**	**Y**	**Z**	**ΔE**	**X**	**Y**	**Z**	**ΔE**	**X**	**Y**	**Z**	**ΔE**
Group 3:	**--------**	**--------**	**-------**	**-------**	**--------**	**---------**	**--------**	**-------**	**--------**	**---------**	**--------**	**-------**	**---------**	**-------**	**--------**	**-------**
Product I	83.0	88.15	93.86	0.28	83.25	88.48	93.25	0.96	77.55	82.66	85.99	2.99	78.14	82.88	87.59	2.38
Stripe 2	83.18	88.33	94.06	0.28	83.01	88.24	93.13	0.87	76.53	81.65	84.88	3.4	79.36	84.2	89.39	1.75
Stripe 3	82.88	88.02	93.88	0.19	82.82	88.04	93.11	0.75	77.77	82.85	86.26	2.89	80.44	85.38	90.97	1.2
Standard	83.09	88.21	94.31	-------	83.04	88.16	94.29	-------	83.12	88.25	94.33	--------	83.01	88.13	94.27	-------
Average	83.02	88.17	93.93	0.25	83.03	88.25	93.16	0.86	77.28	82.39	85.71	3.09	79.31	84.15	89.32	1.78
Product J	78.93	83.9	87.62	0.13	78.81	83.81	86.89	0.59	75.21	80.03	82.74	1.83	62.48	66.1	66.94	8.58
Stripe 2	78.91	83.88	87.64	0.1	78.89	83.86	87.33	0.31	75.71	80.55	83.39	1.58	59.49	62.89	63.46	10.24
Stripe 3	78.71	83.67	87.62	0.09	78.84	83.81	87.42	0.21	75.58	80.41	83.3	1.63	61.55	65.1	65.98	9.06
Standard	78.86	83.82	87.71	-------	78.82	83.77	87.66	-------	78.91	83.87	87.7	------	78.96	83.91	87.79	-------
Average	78.85	83.82	87.63	0.11	78.85	83.83	87.21	0.37	75.5	80.33	83.14	1.68	61.17	64.7	65.46	9.29
Product K	83.81	89.02	94.02	0.32	83.78	89.01	93.6	0.64	81.61	86.72	91.01	1.1	66.05	69.85	71.87	8.77
Stripe 2	83.93	89.15	94.12	0.37	83.49	88.72	93.31	0.62	80.83	85.93	90.23	1.37	68.7	72.7	75.18	7.36
Stripe 3	83.58	88.79	93.93	0.2	83.37	88.6	93.35	0.5	81.82	86.94	91.51	0.92	71.51	75.72	78.78	5.89
Standard	83.57	88.76	94.18	-------	83.44	88.62	94.1	-------	83.59	88.78	94.18	-------	83.59	88.78	94.18	-------
Average	83.77	88.99	94.02	0.30	83.55	88.78	93.42	0.59	81.42	86.53	90.92	1.13	68.75	72.76	75.28	7.34
Product L	78.93	83.9	90.58	0.57	78.81	83.78	90.43	0.62	78.64	83.59	90.24	0.54	73.31	77.81	82.83	2.64
Stripe 2	78.68	83.64	90.38	0.45	78.49	83.45	90.18	0.46	78.62	83.58	90.18	0.56	70.07	74.33	78.71	4.25
Stripe 3	78.36	83.31	90.13	0.29	78.16	83.11	89.91	0.31	78.22	83.17	89.87	0.38	67.75	71.84	75.99	5.4
Standard	78	82.91	90.03	-------	77.8	82.71	89.84	-------	77.78	82.69	89.8	-------	78.18	83.1	90.11	-------
Average	78.66	83.62	90.36	0.44	78.49	83.45	90.17	0.46	78.49	83.45	90.10	0.49	70.38	74.66	79.18	4.10

Blocking Resistance

	Grouping	Pair 1	Pair 2	Pair 3
Group 1:	**High Gloss Non-Flats**			
Product A	H	10	10	10
Product B	H	2	2	2
Product C	L	9	9	9
Product D	L	3	3	3
Group 2:	**Med. Gloss Non-Flats**			
Product E	H	3	6	6
Product F	H	7	7	7
Product G	L	10	10	10
Product H	L			
Group 3:	**Low Gloss Non-Flats**			
Product I	H	9	9	9
Product J	H	9	9	9
Product K	L	9	9	9
Product L	L	10	10	10

Flow & Leveling and Sag

	Pub. VOC	Grouping		Flow/Level				Sag			
Group 1:	**High Gloss Non-flats**			**1**	**2**	**3**	**Avg**	**1**	**2**	**3**	**Avg**
Product A	242 g/L	> 50g/L	H	4	5	5	4.7	11	10	11	10.7
Product B	149 g/L	> 50g/L	H	6	6	6	6	7	7	7	7
Product C	47 g/L	≤ 50g/L	L	6	6	6	6	7	6	6	6.3
Product D	0 g/L	≤ 50g/L	L	6	6	6	6	7	7	7	7
Group 2:	**Med. Gloss Non-flats**			-------	----------	-------	----------	----------	-------	--------	----------
Product E	150 g/L	> 50g/L	H	5	5	5	5	12+	12+	12+	12+
Product F	144 g/L	> 50g/L	H	4	4	4	4	12+	12+	12+	12+
Product G	0 g/L	≤ 50g/L	L	5	5	5	5	10	10	10	10
Product H	0 g/L	≤ 50g/L	L	0	0	0	0	12+	12+	12+	12+
Group 3:	**Low Gloss Non-flats**			-------	----------	-------	----------	----------	-------	--------	----------
Product I	150 g/L	> 50g/L	H	4	4	4	4	12+	12+	12+	12+
Product J	112 g/L	> 50g/L	H	5	4	5	4.7	9	9	9	9
Product K	<50 g/L	≤ 50g/L	L	4	4	4	4	12+	12+	12+	12+
Product L	49 g/L	≤ 50g/L	L	0	0	0	0	12+	12+	12+	12+

QUV – Gloss – 0 Hours

	Pub. VOC	Grouping		Gloss (5 readings per replicate) - QUV 0 Hours					
Group 1:	**High Gloss Non-flats**			**20° Mean**	**20° Std. Dev.**	**60° Mean**	**60° Std. Dev.**	**85° Mean**	**85° Std. Dev.**
Product A	242 g/L	> 50g/L	H	47.4	0.2	79.4	0.1	98	0.8
	Replicate 2			45.5	0.4	78.8	0.2	98.4	0.6
	Replicate 3			46.1	0.1	79.1	0.2	97.4	0.2
	Average			46.3	0.2	79.1	0.2	97.9	0.5
Product B	149 g/L	> 50g/L	H	34	0.2	69.2	0.2	96.6	0.4
	Replicate 2			34.4	0.2	69.4	0.1	96.4	0.2
	Replicate 3			34.8	0.2	69.5	0.2	95.5	0.8
	Average			34.4	0.2	69.4	0.2	96.2	0.5
Product C	47 g/L	≤ 50g/L	L	70.6	0.2	85.7	0.2	97.9	0.8
	Replicate 2			70.6	0.2	85.7	0.2	98.8	0.2
	Replicate 3			71.3	0.6	86.1	0.2	97.1	1
	Average			70.8	0.3	85.8	0.2	97.9	0.7
Product D	0 g/L	≤ 50g/L	L	21.3	0.6	58.5	0.2	89.3	0.2
	Replicate 2			21.5	0.8	58.6	0.4	89	1.2
	Replicate 3			21	0.8	58.3	0.6	89.3	0.4
	Average			21.3	0.7	58.5	0.4	89.2	0.6
Group 2:	**Med. Gloss Non-flats**			----------	----------	----------	----------	----------	----------
Product E	150 g/L	> 50g/L	H	18.6	0.2	58.1	0.2	87.8	0.8
	Replicate 2			18.8	0.2	58.3	0.2	87	0.4
	Replicate 3			17.6	0.6	57.3	0.1	85.6	0.6
	Average			18.3	0.3	57.9	0.2	86.8	0.6
Product F	144 g/L	> 50g/L	H	19.6	0.2	58.7	0.2	92	1
	Replicate 2			19.6	0.6	60.4	0.6	92.6	1.4
	Replicate 3			20.1	0.4	58.9	0.2	93.8	1.2
	Average			19.8	0.4	59.3	0.3	92.8	1.2
Product G	0 g/L	≤ 50g/L	L	3.6	0.1	25.3	0.1	53.8	0.2
	Replicate 2			3.5	0.1	24.7	0.2	53.7	0.4
	Replicate 3			3.4	0.1	24.7	0.2	53.2	0.4
	Average			3.5	0.1	24.9	0.2	53.6	0.3
Product H	0 g/L	≤ 50g/L	L	4.4	0.1	30.7	0.1	81.8	0.6
	Replicate 2			4.6	0.1	31.5	0.2	82.7	0.8
	Replicate 3			4.4	0.1	30.6	0.2	80.8	1.6
	Average			4.5	0.1	30.9	0.2	81.8	1.0
Group 3:	**Low Gloss Non-flats**			----------	----------	----------	----------	----------	----------
Product I	150 g/L	> 50g/L	H	3.9	0.1	28.1	0.2	73.4	0.2
	Replicate 2			3.7	0.1	27.1	0.1	73.8	0.6
	Replicate 3			3.9	0.1	27.6	0.2	72.9	1
	Average			3.8	0.1	27.6	0.2	73.4	0.6
Product J	112 g/L	> 50g/L	H	1.4	0.1	5.6	0.1	27.8	0.4
	Replicate 2			1.4	0.1	5.6	0.1	28.3	0.2
	Replicate 3			1.4	0.1	5.4	0.2	27	0.2
	Average			1.4	0.1	5.5	0.1	27.7	0.3
Product K	<50 g/L	≤ 50g/L	L	1.5	0.1	5.7	0.1	28.1	0.4
	Replicate 2			1.5	0.1	5.7	0.1	27.9	0.6
	Replicate 3			1.5	0.1	5.7	0.1	28.1	0.6
	Average			1.5	0.1	5.7	0.1	28.0	0.5
Product L	49 g/L	≤ 50g/L	L	1.4	0.1	4.6	0.1	14.3	0.2
	Replicate 2			1.4	0.1	4.6	0.1	14.1	0.2
	Replicate 3			1.3	0.1	4.4	0.1	13.3	0.2
	Average			1.4	0.1	4.5	0.1	13.9	0.2

QUV – Gloss – 200 Hours

	Pub. VOC	Grouping		Gloss (5 readings per replicate) - QUV 200 Hours					
Group 1:	**High Gloss Non-flats**			**20° Mean**	**20° Std. Dev.**	**60° Mean**	**60° Std. Dev.**	**85° Mean**	**85° Std. Dev.**
Product A	242 g/L	> 50g/L	H	37.5	0.6	77.4	0.2	97.4	0.4
Replicate 2				32.6	1.4	73.2	1.4	94.1	1.0
Replicate 3				33.3	0.6	75.7	0.6	95.9	0.8
Average				34.5	0.9	75.4	0.7	95.8	0.7
Product B	149 g/L	> 50g/L	H	10.6	0.4	50.2	0.4	93.2	0.4
Replicate 2				9.2	0.4	47.9	0.8	91.5	0.6
Replicate 3				9.1	0.2	47.6	0.2	91.8	0.4
Average				9.6	0.3	48.6	0.5	92.2	0.5
Product C	47 g/L	≤ 50g/L	L	38.8	0.6	79.1	0.6	97.2	0.2
Replicate 2				40.8	0.8	79.8	0.2	97.8	0.8
Replicate 3				42.2	0.4	79.5	0.4	98.0	0.4
Average				40.6	0.6	79.5	0.4	97.7	0.5
Product D	0 g/L	≤ 50g/L	L	15.8	0.4	53.8	0.4	88.1	0.6
Replicate 2				16.0	0.6	54.5	0.6	88.8	0.8
Replicate 3				13.1	0.6	50.5	0.6	87.1	0.8
Average				15.0	0.5	52.9	0.5	88.0	0.7
Group 2:	**Med. Gloss Non-flats**			----------	----------	----------	----------	----------	----------
Product E	150 g/L	> 50g/L	H	5.3	0.1	33.3	0.2	80.7	0.4
Replicate 2				4.0	0.2	28.0	0.4	75.3	0.6
Replicate 3				3.8	0.1	26.5	0.2	74.1	0.2
Average				4.4	0.1	29.3	0.3	76.7	0.4
Product F	144 g/L	> 50g/L	H	9.1	0.2	47.8	0.2	91.0	0.4
Replicate 2				11.0	0.2	50.4	0.2	93.0	1.0
Replicate 3				9.8	0.2	48.0	0.2	91.7	0.2
Average				10.0	0.2	48.7	0.2	91.9	0.5
Product G	0 g/L	≤ 50g/L	L	1.8	0.1	18.4	0.2	58.7	0.2
Replicate 2				1.8	0.1	17.8	0.4	58.2	0.2
Replicate 3				2.0	0.1	19.5	0.1	58.0	0.8
Average				1.9	0.1	18.6	0.2	58.3	0.4
Product H	0 g/L	≤ 50g/L	L	3.5	0.1	25.8	0.2	75.7	0.2
Replicate 2				3.6	0.1	26.8	0.6	76.6	0.6
Replicate 3				3.3	0.2	25.0	0.6	75.7	0.6
Average				3.5	0.1	25.9	0.5	76.0	0.5
Group 3:	**Low Gloss Non-flats**			----------	----------	----------	----------	----------	----------
Product I	150 g/L	> 50g/L	H	3.8	0.1	29.1	0.2	73.1	0.6
Replicate 2				3.8	0.1	29.9	0.2	74.5	0.6
Replicate 3				3.9	0.1	29.4	0.2	74.2	0.6
Average				3.8	0.1	29.5	0.2	73.9	0.6
Product J	112 g/L	> 50g/L	H	1.3	0.1	4.3	0.1	22.3	0.2
Replicate 2				1.3	0.1	4.3	0.1	22.3	0.2
Replicate 3				1.3	0.1	4.2	0.1	21.4	0.2
Average				1.3	0.1	4.3	0.1	22.0	0.2
Product K	<50 g/L	≤ 50g/L	L	1.4	0.1	3.7	0.1	23.0	0.2
Replicate 2				1.3	0.1	3.8	0.1	22.6	0.2
Replicate 3				1.4	0.1	3.6	0.1	22.5	0.2
Average				1.4	0.1	3.7	0.1	22.7	0.2
Product L	49 g/L	≤ 50g/L	L	1.5	0.1	6.2	0.1	23.0	0.2
Replicate 2				1.5	0.1	6.3	0.2	22.7	0.6
Replicate 3				1.4	0.1	5.6	0.2	17.4	0.2
Average				1.5	0.1	6.0	0.2	21.0	0.3

QUV – Gloss – 400 Hours

	Pub. VOC	Grouping		Gloss (5 readings per replicate) - QUV 400 Hours					
Group 1:	**High Gloss Non-flats**			**20° Mean**	**20° Std. Dev.**	**60° Mean**	**60° Std. Dev.**	**85° Mean**	**85° Std. Dev.**
Product A	242 g/L	> 50g/L	H	36.3	0.4	74.5	0.4	100.8	0.6
Replicate 2				34.3	0.6	73.9	0.4	100.2	0.4
Replicate 3				34.7	0.2	74.3	0.2	98.8	0.6
Average				35.1	0.4	74.2	0.3	99.9	0.5
Product B	149 g/L	> 50g/L	H	10.0	0.6	47.2	1.0	93.9	0.6
Replicate 2				10.7	0.8	47.7	1.2	94.6	0.4
Replicate 3				9.1	0.2	45.4	0.6	93.7	1.0
Average				9.9	0.5	46.8	0.9	94.1	0.7
Product C	47 g/L	≤ 50g/L	L	35.6	0.4	78.1	0.6	99.7	1.6
Replicate 2				39.3	2.2	79.2	0.8	99.4	0.6
Replicate 3				41.9	2.0	80.4	0.6	97.1	2.4
Average				38.9	1.5	79.2	0.7	98.7	1.5
Product D	0 g/L	≤ 50g/L	L	16.3	0.8	54.8	0.4	90.5	1.2
Replicate 2				16.5	0.6	55.5	0.4	90.6	0.4
Replicate 3				13.2	0.6	51.0	0.6	87.2	0.4
Average				15.3	0.7	53.8	0.5	89.4	0.7
Group 2:	**Med. Gloss Non-flats**			----------	----------	----------	----------	----------	----------
Product E	150 g/L	> 50g/L	H	3.9	0.1	28.5	0.2	79.7	0.8
Replicate 2				3.6	0.2	27.3	0.4	77.4	0.2
Replicate 3				3.6	0.1	26.9	0.2	77.1	1.6
Average				3.7	0.1	27.6	0.3	78.1	0.9
Product F	144 g/L	> 50g/L	H	9.5	0.2	47.6	0.2	89.6	1.0
Replicate 2				9.4	0.2	47.9	0.4	92.8	1.4
Replicate 3				9.6	0.2	47.5	0.4	92.7	1.0
Average				9.5	0.2	47.7	0.3	91.7	1.1
Product G	0 g/L	≤ 50g/L	L	1.5	0.1	14.2	0.2	58.5	0.6
Replicate 2				1.5	0.1	14.3	0.4	59.2	0.4
Replicate 3				1.6	0.1	15.1	0.2	58.4	0.6
Average				1.5	0.1	14.5	0.3	58.7	0.5
Product H	0 g/L	≤ 50g/L	L	3.4	0.1	26.4	0.4	80.6	0.8
Replicate 2				3.3	0.1	26.2	0.6	81.5	1.0
Replicate 3				3.2	0.2	25.6	0.6	79.8	0.8
Average				3.3	0.1	26.1	0.5	80.6	0.9
Group 3:	**Low Gloss Non-flats**			----------	----------	----------	----------	----------	----------
Product I	150 g/L	> 50g/L	H	3.7	0.1	29.0	0.2	76.0	0.6
Replicate 2				3.6	0.1	29.1	0.2	77.3	0.4
Replicate 3				3.6	0.1	28.8	0.1	75.5	1.4
Average				3.6	0.1	29.0	0.2	76.3	0.8
Product J	112 g/L	> 50g/L	H	1.3	0.1	3.7	0.1	22.3	0.2
Replicate 2				1.2	0.1	1.2	0.1	23.8	0.1
Replicate 3				1.2	0.1	3.7	0.1	21.3	0.2
Average				1.2	0.1	2.9	0.1	22.5	0.2
Product K	<50 g/L	≤ 50g/L	L	1.3	0.1	3.2	0.1	23.4	0.2
Replicate 2				1.3	0.1	3.3	0.1	23.4	0.6
Replicate 3				1.3	0.1	3.2	0.1	23.1	0.4
Average				1.3	0.1	3.2	0.1	23.3	0.4
Product L	49 g/L	≤ 50g/L	L	1.5	0.1	6.3	0.1	28.5	1.0
Replicate 2				1.6	0.1	8.4	0.2	31.8	1.2

Replicate 3				1.4	0.1	6.1	0.2	22.0	0.8
Average				1.5	0.1	6.9	0.2	27.6	1.0

QUV – Gloss – 600 Hours

	Pub. VOC	Grouping		Gloss (5 readings per replicate) - QUV 600 Hours					
Group 1:	**High Gloss Non-flats**			**20° Mean**	**20° Std. Dev.**	**60° Mean**	**60° Std. Dev.**	**85° Mean**	**85° Std. Dev.**
Product A	242 g/L	> 50g/L	H	29.2	0.2	71.9	0.4	99.2	0.2
Replicate 2				26.0	0.4	69.6	0.2	96.7	0.2
Replicate 3				26.9	0.6	70.9	0.6	97.1	0.4
Average				27.4	0.4	70.8	0.4	97.7	0.3
Product B	149 g/L	> 50g/L	H	8.5	0.8	46.8	1.0	93.4	0.2
Replicate 2				7.5	0.4	44.8	0.8	94.4	0.2
Replicate 3				6.7	0.2	42.5	0.4	93.6	0.2
Average				7.6	0.5	44.7	0.7	93.8	0.2
Product C	47 g/L	≤ 50g/L	L	28.1	0.2	75.8	0.4	99.3	0.4
Replicate 2				30.6	1.6	76.0	1.0	98.9	0.8
Replicate 3				33.7	1.0	77.0	0.6	99.5	0.4
Average				30.8	0.9	76.3	0.7	99.2	0.5
Product D	0 g/L	≤ 50g/L	L	13.8	0.2	52.9	0.2	90.2	0.4
Replicate 2				15.5	1.0	54.8	1.2	90.6	0.4
Replicate 3				13.3	0.6	51.2	0.8	89.0	0.2
Average				14.2	0.6	53.0	0.7	89.9	0.3
Group 2:	**Med. Gloss Non-flats**			----------	----------	----------	----------	----------	----------
Product E	150 g/L	> 50g/L	H	3.7	0.1	28.1	0.2	80.1	0.4
Replicate 2				3.3	0.1	25.9	0.2	76.4	0.6
Replicate 3				3.0	0.2	23.5	0.4	76.0	0.8
Average				3.3	0.1	25.8	0.3	77.5	0.6
Product F	144 g/L	> 50g/L	H	7.2	0.1	44.5	0.2	93.6	0.4
Replicate 2				7.4	0.4	43.8	0.6	94.7	0.8
Replicate 3				7.6	0.2	44.9	0.2	91.7	0.4
Average				7.4	0.2	44.4	0.3	93.3	0.5
Product G	0 g/L	≤ 50g/L	L	1.4	0.1	12.4	0.2	58.7	1.0
Replicate 2				1.4	0.1	12.1	0.2	56.3	0.8
Replicate 3				1.4	0.1	12.9	0.2	56.7	0.8
Average				1.4	0.1	12.5	0.2	57.2	0.9
Product H	0 g/L	≤ 50g/L	L	2.8	0.1	22.7	0.4	77.3	0.4
Replicate 2				2.8	0.2	22.5	0.2	76.5	0.6
Replicate 3				2.8	0.1	22.2	0.4	76.5	1.0
Average				2.8	0.1	22.5	0.3	76.8	0.7
Group 3:	**Low Gloss Non-flats**			----------	----------	----------	----------	----------	----------
Product I	150 g/L	> 50g/L	H	3.0	0.2	25.4	0.6	75.1	0.2
Replicate 2				3.1	0.1	26.2	0.2	76.9	0.4
Replicate 3				3.1	0.1	25.8	0.2	74.9	0.4
Average				3.1	0.1	25.8	0.3	75.6	0.3
Product J	112 g/L	> 50g/L	H	1.2	0.1	3.0	0.1	18.7	0.2
Replicate 2				1.2	0.1	3.1	0.1	18.0	0.2
Replicate 3				1.2	0.1	2.9	0.1	17.0	0.2
Average				1.2	0.1	3.0	0.1	17.9	0.2
Product K	<50 g/L	≤ 50g/L	L	1.3	0.1	2.9	0.1	22.1	0.1
Replicate 2				1.3	0.1	2.8	0.1	21.3	0.2
Replicate 3				1.3	0.1	2.9	0.1	21.5	0.8
Average				1.3	0.1	2.9	0.1	21.6	0.4

Product L	49 g/L	≤ 50g/L	L	1.4	0.1	5.5	0.1	29.0	0.4
Replicate 2				1.4	0.1	5.5	0.1	29.1	1.0
Replicate 3				1.3	0.1	5.2	0.1	25.0	1.2
Average				1.4	0.1	5.3	0.1	27.7	0.9

QUV – Gloss – 800 Hours

	Pub. VOC	**Grouping**		**Gloss (5 readings per replicate) - QUV 800 Hours**					
Group 1:	**High Gloss Non-flats**			**20° Mean**	**20° Std. Dev.**	**60° Mean**	**60° Std. Dev.**	**85° Mean**	**85° Std. Dev.**
Product A	242 g/L	> 50g/L	H	23.5	1.2	66.7	1.8	92.4	1.0
Replicate 2				21.0	1.4	63.9	1.4	91.0	1.0
Replicate 3				22.2	1.8	65.2	2.4	91.4	0.6
Average				22.2	1.5	65.3	1.9	91.6	0.9
Product B	149 g/L	> 50g/L	H	7.6	1.0	44.7	1.6	89.4	0.6
Replicate 2				8.2	0.6	45.6	1.2	89.7	0.2
Replicate 3				6.1	0.2	40.1	1.0	88.2	0.6
Average				7.3	0.6	43.5	1.3	89.1	0.5
Product C	47 g/L	≤ 50g/L	L	26.7	1.8	72.8	0.8	96.4	0.2
Replicate 2				28.6	2.2	74.5	1.2	93.7	1.8
Replicate 3				31.4	1.6	75.6	1.0	95.9	0.6
Average				28.9	1.9	74.3	1.0	95.3	0.9
Product D	0 g/L	≤ 50g/L	L	12.2	0.4	51.0	0.4	85.2	1.0
Replicate 2				13.1	0.2	51.8	0.6	86.9	0.4
Replicate 3				11.6	0.4	49.4	1.0	85.0	0.6
Average				12.3	0.3	50.7	0.7	85.7	0.7
Group 2:	**Med. Gloss Non-flats**			----------	----------	----------	----------	----------	----------
Product E	150 g/L	> 50g/L	H	3.6	0.2	28.4	0.4	76.9	0.4
Replicate 2				3.1	0.2	25.5	0.4	73.7	0.6
Replicate 3				3.2	0.1	25.3	0.2	72.8	0.6
Average				3.3	0.2	26.4	0.3	74.5	0.5
Product F	144 g/L	> 50g/L	H	6.1	0.4	40.0	0.6	87.9	0.8
Replicate 2				6.0	0.4	40.4	1.0	88.3	1.4
Replicate 3				6.6	0.4	41.8	0.6	85.8	1.0
Average				6.2	0.4	40.7	0.7	87.3	1.1
Product G	0 g/L	≤ 50g/L	L	1.4	0.1	11.1	0.2	56.3	0.6
Replicate 2				1.4	0.1	10.9	0.4	55.0	0.2
Replicate 3				1.3	0.1	11.5	0.2	55.2	1.2
Average				1.4	0.1	11.2	0.3	55.5	0.7
Product H	0 g/L	≤ 50g/L	L	2.6	0.1	21.7	0.8	73.3	0.4
Replicate 2				2.6	0.2	21.4	0.8	73.8	1.0
Replicate 3				2.5	0.2	21.2	1.0	73.8	0.8
Average				2.6	0.2	21.4	0.9	73.6	0.7
Group 3:	**Low Gloss Non-flats**			----------	----------	----------	----------	----------	----------
Product I	150 g/L	> 50g/L	H	2.7	0.2	23.6	0.6	73.0	0.2
Replicate 2				2.7	0.1	24.1	0.4	74.5	0.4
Replicate 3				2.8	0.1	24.8	0.2	73.0	0.6
Average				2.7	0.1	24.2	0.4	73.5	0.4
Product J	112 g/L	> 50g/L	H	1.2	0.1	2.8	0.1	15.8	0.2
Replicate 2				1.2	0.1	2.8	0.1	16.2	0.2
Replicate 3				1.2	0.1	2.9	0.1	15.9	0.2
Average				1.2	0.1	2.8	0.1	16.0	0.2
Product K	<50 g/L	≤ 50g/L	L	1.2	0.1	2.7	0.1	20.8	0.2
Replicate 2				1.2	0.1	2.7	0.1	20.2	0.2
Replicate 3				1.3	0.1	2.8	0.1	20.5	0.6
Average				1.2	0.1	2.7	0.1	20.5	0.3
Product L	49 g/L	≤ 50g/L	L	1.3	0.1	5.6	0.2	30.2	0.6

Replicate 2	1.4	0.1	6.2	0.1	30.3	1.2
Replicate 3	1.3	0.1	5.5	0.2	26.3	1.2
Average	1.3	0.1	5.8	0.2	29.1	1.0

QUV – Gloss – 1000 Hours

	Pub. VOC	Grouping		Gloss (5 readings per replicate) - QUV 1000 Hours					
Group 1:	**High Gloss Non-flats**			**20° Mean**	**20° Std. Dev.**	**60° Mean**	**60° Std. Dev.**	**85° Mean**	**85° Std. Dev.**
Product A	242 g/L	> 50g/L	H	13.5	4.0	52.1	6.6	91.8	1.4
	Replicate 2			10.1	3.4	47.9	5.2	91.0	0.8
	Replicate 3			12.1	4.4	52.1	8.2	91.1	1.0
	Average			11.9	3.9	50.7	6.7	91.3	1.1
Product B	149 g/L	> 50g/L	H	6.2	0.4	41.1	1.0	88.7	0.2
	Replicate 2			7.1	1.4	43.0	3.2	88.5	0.6
	Replicate 3			5.4	0.2	37.6	0.2	88.0	0.6
	Average			6.2	0.7	40.6	1.5	88.4	0.5
Product C	47 g/L	≤ 50g/L	L	20.2	1.0	68.8	1.2	96.3	0.4
	Replicate 2			19.5	1.6	67.9	1.6	94.8	1.0
	Replicate 3			22.3	1.2	69.3	1.0	96.0	0.4
	Average			20.7	1.3	68.7	1.3	95.7	0.6
Product D	0 g/L	≤ 50g/L	L	12.0	0.4	51.6	0.8	85.7	0.6
	Replicate 2			12.3	0.4	51.8	0.8	86.3	0.6
	Replicate 3			10.9	0.4	48.8	0.4	84.9	0.6
	Average			11.7	0.4	50.7	0.7	85.6	0.6
Group 2:	**Med. Gloss Non-flats**			----------	----------	----------	----------	----------	----------
Product E	150 g/L	> 50g/L	H	2.9	0.2	24.4	0.6	75.6	0.4
	Replicate 2			2.8	0.1	23.3	0.4	73.0	0.4
	Replicate 3			2.5	0.1	20.7	0.2	71.6	0.2
	Average			2.7	0.1	22.8	0.4	73.4	0.3
Product F	144 g/L	> 50g/L	H	3.0	0.2	29.1	1.2	86.3	0.4
	Replicate 2			3.8	0.2	32.0	0.8	87.4	1.2
	Replicate 3			3.7	0.4	33.7	2.2	87.2	0.4
	Average			3.5	0.3	31.6	1.4	87.0	0.7
Product G	0 g/L	≤ 50g/L	L	1.4	0.1	10.0	0.2	56.4	0.4
	Replicate 2			1.3	0.1	10.0	0.4	54.8	0.4
	Replicate 3			1.4	0.1	10.2	0.2	55.0	0.8
	Average			1.4	0.1	10.1	0.3	55.4	0.5
Product H	0 g/L	≤ 50g/L	L	2.2	0.2	18.7	1.0	71.7	0.8
	Replicate 2			2.2	0.1	18.4	1.0	72.6	0.6
	Replicate 3			2.1	0.2	17.5	1.2	72.8	0.8
	Average			2.2	0.2	18.2	1.1	72.4	0.7
Group 3:	**Low Gloss Non-flats**			----------	----------	----------	----------	----------	----------
Product I	150 g/L	> 50g/L	H	2.2	0.2	19.2	0.8	71.7	0.4
	Replicate 2			2.2	0.1	19.8	0.4	74.0	0.6
	Replicate 3			2.3	0.1	20.6	0.6	73.1	0.6
	Average			2.2	0.1	19.9	0.6	72.9	0.5
Product J	112 g/L	> 50g/L	H	1.2	0.1	2.5	0.1	15.0	0.4
	Replicate 2			1.2	0.1	2.6	0.1	15.2	0.2
	Replicate 3			1.2	0.1	2.6	0.1	15.1	0.2
	Average			1.2	0.1	2.6	0.1	15.1	0.3
Product K	<50 g/L	≤ 50g/L	L	1.3	0.1	2.6	0.1	20.2	0.2
	Replicate 2			1.3	0.1	2.6	0.1	19.8	0.2
	Replicate 3			1.3	0.1	2.7	0.1	20.2	0.8
	Average			1.3	0.1	2.6	0.1	20.1	0.4
Product L	49 g/L	≤ 50g/L	L	1.3	0.1	4.9	0.4	29.3	0.4
	Replicate 2			1.4	0.1	5.4	0.2	29.8	0.2
	Replicate 3			1.3	0.1	4.5	0.2	25.3	0.2
	Average			1.3	0.1	4.9	0.3	28.1	0.3

QUV – Color

	0 Hours			200 Hours				400 Hours				600 Hours				800 Hours			
Group 1:	**X**	**Y**	**Z**	**X**	**Y**	**Z**	**ΔE**	**X**	**Y**	**Z**	**ΔE**	**X**	**Y**	**Z**	**ΔE**	**X**	**Y**	**Z**	**ΔE**
Product A	79.22	84.35	91.11	78.54	83.6	91.09	0.64	78.95	84.04	91.4	0.45	78.77	83.9	91.17	0.42	79.83	85.05	91.47	0.42
Replicate 2	77.36	82.39	89.5	78.62	83.69	91.16	0.6	78.98	84.08	91.41	0.74	78.7	83.83	91.03	0.63	78.82	84	90.91	0.75
Replicate 3	77.24	82.28	89.88	77.34	82.37	90.25	0.2	77.48	82.53	90.41	0.21	77.47	82.55	90.18	0.14	77.62	82.74	90.11	0.3
Average	77.94	83.01	90.16	78.17	83.22	90.83	0.48	78.47	83.55	91.07	0.467	78.313	83.43	90.79	0.40	78.76	83.93	90.83	0.49
Product B	80.47	85.46	91.93	81.48	86.53	93.38	0.5	81.7	86.74	93.74	0.62	81.43	86.47	93.43	0.51	81.61	86.66	93.58	0.57
Replicate 2	80.76	85.76	92.11	81.91	86.97	93.63	0.54	81.84	86.88	93.73	0.56	81.96	87.01	93.76	0.57	82.41	87.5	94.25	0.70
Replicate 3	80.1	85.04	91.02	82.15	87.19	93.76	0.97	82.87	87.92	94.58	1.27	82.34	87.41	94.04	1.06	82.95	88.04	94.6	1.3
Average	80.44	85.42	91.69	81.85	86.90	93.59	0.67	82.14	87.18	94.02	0.82	81.91	86.96	93.74	0.71	82.32	87.4	94.14	0.88
Product C	77.53	82.44	85.31	78.18	83.18	85.84	0.39	78.46	83.47	86.19	0.49	78.79	83.84	86.7	0.63	79.1	84.16	86.91	0.78
Replicate 2	77.89	82.84	86.07	78.11	83.11	85.84	0.39	78.24	83.25	86.17	0.31	78.64	83.68	86.58	0.46	78.7	83.77	86.68	0.5
Replicate 3	79.71	84.65	86.56	79.75	84.69	86.13	0.34	79.93	84.88	86.32	0.36	80.32	85.29	86.63	0.51	80.7	85.69	86.82	0.74
Average	78.38	83.31	85.98	78.68	83.66	85.94	0.37	78.88	83.87	86.23	0.39	79.25	84.27	86.64	0.533	79.5	84.54	86.8	0.67
Product D	80.77	85.85	91.7	82.71	87.85	93.62	0.87	81.13	86.2	92.81	0.54	81.82	86.91	92.72	0.47	80.27	85.33	92.22	0.77
Replicate 2	81.39	86.5	92.1	80.64	85.7	92.22	0.76	81.88	86.98	93.26	0.5	82.5	87.64	93.64	0.54	80.93	86.02	92.73	0.82
Replicate 3	81.35	86.46	92.08	80.94	86.02	92.53	0.66	80.49	85.52	92.31	0.94	79.7	84.72	91.53	1.17	80.44	85.5	92.43	1.04
Average	81.17	86.27	91.96	81.43	86.52	92.79	0.76	81.17	86.23	92.79	0.66	81.34	86.42	92.63	0.73	80.55	85.62	92.46	0.88
Group 2:	**--------**	**--------**	**-------**	**--------**	**--------**	**-------**	**------**	--------	--------	--------	-------	--------	--------	-------	----	------	------	--------	-------
Product E	79.9	84.76	89.1	80.7	85.59	90.4	0.46	80.89	85.81	90.64	0.54	80.67	85.6	90.3	0.42	80.42	85.35	90.18	0.41
Replicate 2	80.56	85.42	89.43	81.39	86.29	90.77	0.47	81.63	86.54	86.54	0.57	81.35	86.29	90.69	0.44	80.82	85.77	90.44	0.49
Replicate 3	78.89	83.74	88.71	80.09	84.98	90.23	0.56	79.89	84.8	90.21	0.53	79.76	84.69	89.94	0.44	79.72	84.65	89.93	0.44
Average	79.78	84.64	89.08	80.73	85.62	90.47	0.50	80.8	85.72	89.13	0.55	80.59	85.53	90.31	0.433	80.32	85.26	90.18	0.45
Product F	79.58	84.56	89.79	78.83	83.79	89.63	0.58	79.56	84.54	90.2	0.3	79.02	83.99	89.71	0.45	79.77	84.78	90.18	0.15
Replicate 2	81.73	86.72	90.59	81.72	86.73	90.95	0.24	81.71	86.72	91.12	0.37	81.82	86.85	91.07	0.25	81.85	86.9	91.12	0.20
Replicate 3	79.77	84.76	89.88	79.47	84.43	89.61	0.16	80.15	85.16	90.57	0.26	80.18	85.21	90.43	0.2	79.88	84.9	90.21	0.15
Average	80.36	85.35	90.09	80.01	84.98	90.06	0.33	80.47	85.47	90.63	0.31	80.34	85.35	90.40	0.3	80.5	85.53	90.5	0.19
Product G	82.6	87.81	93.14	82.91	88.11	92.45	0.71	82.97	88.2	92.29	0.88	82.78	88.00	91.77	1.08	83.38	88.61	91.78	1.55
Replicate 2	81.72	86.9	92.66	81.81	86.99	91.9	0.59	82.09	87.29	91.83	0.87	81.76	86.96	91.3	0.98	81.59	86.77	91.08	1.00
Replicate 3	81.75	86.93	92.62	81.67	86.85	91.91	0.43	81.59	86.78	91.52	0.65	80.86	86.02	90.78	0.72	81.25	86.43	90.82	0.9
Average	82.02	87.21	92.81	82.13	87.32	92.09	0.58	82.22	87.42	91.88	0.8	81.8	86.99	91.28	0.93	82.07	87.27	91.23	1.15
Product H	79.37	84.3	90.29	79.39	84.33	90.22	0.08	80.05	85.00	90.8	0.35	79.41	84.36	90.4	0.06	79.32	84.26	90.19	0.00
Replicate 2	81.56	86.52	91.45	81.6	86.59	91.42	0.07	81.87	86.85	91.81	0.14	81.9	86.91	91.87	0.17	82.3	87.31	92.1	0.36
Replicate 3	79.58	84.51	90.39	78.71	83.63	89.8	0.46	79.2	84.14	90.3	0.27	80.28	85.25	90.96	0.35	79.58	84.54	90.62	0.14
Average	80.17	85.11	90.71	79.9	84.85	90.48	0.20	80.37	85.33	90.97	0.25	80.53	85.51	91.08	0.19	80.4	85.37	90.97	0.19
Group 3:	**--------**	**--------**	**-------**	**--------**	**--------**	**-------**	**------**	--------	--------	--------	-------	--------	-------	-------	----	------	------	--------	-------
Product I	83.1	88.19	94.18	83.08	88.14	94.23	0.08	83.03	88.08	94.31	0.19	83.5	88.59	94.69	0.18	83.55	88.66	94.72	0.2
Replicate 2	81.92	86.97	93.44	81.56	86.59	93.22	0.21	81.65	86.66	93.37	0.22	81.65	86.69	93.38	0.2	81.77	86.81	93.47	0.15

Replicate 3	83.15	88.23	94.14	81.84	86.87	93.37	0.74	82.43	87.49	93.91	0.5	82.57	87.64	94.02	0.42	83.12	88.22	94.43	0.2
Average	82.72	87.8	93.92	82.16	87.2	93.61	0.34	82.37	87.41	93.86	0.30	82.57	87.64	94.03	0.267	82.81	87.9	94.21	0.18
Product J	78.62	83.54	87.46	77.8	82.67	87.03	0.52	77.74	82.61	87.14	0.63	77.07	81.94	86.49	0.88	76.58	81.44	85.93	1.06
Replicate 2	78.5	83.42	87.39	77.75	82.62	87.05	0.5	77.45	82.31	86.87	0.67	76.9	81.76	86.3	0.88	76.71	81.57	86.02	0.92
Replicate 3	78.09	83	87.2	76.08	80.86	85.38	1.00	76.93	81.78	86.61	0.74	75.99	80.82	85.78	1.16	75.62	80.45	85.37	1.3
Average	78.4	83.32	87.35	77.21	82.05	86.49	0.67	77.37	82.23	86.87	0.68	76.65	81.51	86.19	0.97	76.3	81.15	85.77	1.09
Product K	82.12	87.23	93.19	81.51	86.57	92.38	0.29	81.64	86.7	92.67	0.24	81.96	87.05	92.87	0.12	81.63	86.71	92.67	0.22
Replicate 2	82.09	87.2	93.16	81.7	86.78	92.43	0.27	81.58	86.64	92.52	0.24	81.65	86.74	92.53	0.22	81.46	86.54	92.47	0.28
Replicate 3	83.84	89.00	94.17	83.65	88.78	93.53	0.29	83.6	88.73	93.69	0.17	83.67	88.81	93.71	0.19	83.64	88.78	93.69	0.19
Average	82.68	87.81	93.51	82.29	87.38	92.78	0.28	82.27	87.36	92.96	0.22	82.43	87.53	93.04	0.18	82.24	87.34	92.94	0.23
Product L	78.18	83.01	89.73	78.05	82.82	88.88	0.47	77.4	82.16	88.3	0.52	77.74	82.53	88.36	0.64	78.32	83.14	88.81	0.75
Replicate 2	78.14	82.97	89.68	77.34	82.08	88.27	0.51	77.8	82.56	88.72	0.42	77.59	82.37	88.28	0.59	78.23	83.03	88.82	0.65
Replicate 3	75.57	80.27	87.36	75.84	80.51	87.13	0.38	75.41	80.06	86.69	0.34	75.27	79.93	86.35	0.48	75.63	80.32	86.65	0.54
Average	77.3	82.08	88.92	77.08	81.80	88.09	0.45	76.87	81.59	87.90	0.43	76.87	81.61	87.66	0.57	77.39	82.16	88.09	0.65

Continued…	**1000 Hours**			
Group 1:	**X**	**Y**	**Z**	**ΔE**
Product A	79.52	84.74	91.31	0.27
Replicate 2	79.6	84.81	91.35	1.19
Replicate 3	78.33	83.49	90.57	0.7
Average	79.15	84.35	91.077	0.72
Product B	81.47	86.52	93.4	0.51
Replicate 2	81.86	86.9	93.59	0.52
Replicate 3	82.51	87.58	94.13	1.11
Average	81.95	87	93.707	0.7133
Product C	79.24	84.33	87.09	0.85
Replicate 2	78.73	83.82	86.68	0.55
Replicate 3	80.55	85.59	86.86	0.64
Average	79.51	84.58	86.877	0.68
Product D	80.47	85.55	92.42	0.73
Replicate 2	80.61	85.7	92.58	0.99
Replicate 3	80.99	86.09	92.89	0.84
Average	80.69	85.78	92.63	0.8533
Group 2:	-------	-------	--------	--------
Product E	80.43	85.37	90.17	0.4
Replicate 2	81.14	86.09	90.48	0.39
Replicate 3	79.52	84.45	89.62	0.33
Average	80.36	85.3	90.09	0.3733
Product F	79.86	84.88	90.17	0.15

Replicate 2	82.61	87.65	91.29	0.44
Replicate 3	79.99	85.02	90.25	0.14
Average	80.82	85.85	90.57	0.2433
Product G	82.64	87.85	91.31	1.29
Replicate 2	81.29	86.47	90.65	1.09
Replicate 3	81.24	86.41	90.54	1.08
Average	81.72	86.91	90.833	1.1533
Product H	80.17	85.15	90.91	0.42
Replicate 2	81.71	86.72	91.81	0.15
Replicate 3	80.14	85.12	90.95	0.27
Average	80.67	85.66	91.223	0.28
Group 3:	-------	-------	--------	--------
Product I	83.24	88.33	94.48	0.11
Replicate 2	81.86	86.91	93.49	0.08
Replicate 3	82.96	88.05	94.32	0.26
Average	82.69	87.76	94.097	0.15
Product J	76.42	81.27	85.77	1.13
Replicate 2	76.4	81.25	85.71	1.06
Replicate 3	75.65	80.47	85.25	1.24
Average	76.16	81	85.577	1.1433
Product K	81.5	86.57	92.52	0.28
Replicate 2	81.69	86.77	92.56	0.21
Replicate 3	83.57	88.7	93.65	0.19
Average	82.25	87.35	92.91	0.2267
Product L	77.67	82.47	87.93	0.89
Replicate 2	77.5	82.28	87.91	0.79
Replicate 3	75.41	80.1	86.06	0.8
Average	76.86	81.62	87.3	0.8267

Surface Tension

	Pub. VOC	Grouping		Surface Tension											
Group 1:	**High Gloss Non-flats**			**Time**	**Temp**	**P**	**D(lb/gal)**	**D(g/m^3)**	**M(g)**	**V(g/m^3)**	**V (g/cm^3)**	**(R^3)/ V**	**F**	**S**	**Avg S**
Product A	242 g/L	> 50g/L	H	13:24	25	9.4	9.92	1188678.16	0.12	136928.41	0.14	6.16	0.81	7.661	**7.72**
Replicate 2				14:25	25	9	9.92	1188678.16	0.11	131101.67	0.13	6.43	0.81	7.309	
Replicate 3				14:16	25	10	9.92	1188678.16	0.12	145668.52	0.15	5.79	0.82	8.191	
Product B	149 g/L	> 50g/L	H	12:20	25	11	10.45	1252186.17	0.13	168796.51	0.17	4.99	0.83	9.117	**8.67**
Replicate 2				12:14	25	10.5	10.45	1252186.17	0.13	161123.94	0.16	5.23	0.83	8.67	
Replicate 3				12:28	25	10	10.45	1252186.17	0.12	153451.37	0.15	5.49	0.82	8.225	
Product C	47 g/L	≤ 50g/L	L	11:42	25	10	10.54	1262970.54	0.12	154772.98	0.15	5.45	0.82	8.231	**8.38**
Replicate 2				11:54	25	10	10.54	1262970.54	0.12	154772.98	0.15	5.45	0.82	8.231	
Replicate 3				12:28	25	10.5	10.54	1262970.54	0.13	162511.63	0.16	5.19	0.83	8.676	
Product D	0 g/L	≤ 50g/L	L	13:52	25	14	10.12	1212643.44	0.17	208047.63	0.21	4.05	0.84	**11.8**	16.92
Replicate 2				12:56	25	24	10.12	1212643.44	0.29	356653.07	0.36	2.36	0.88	21.08	
Replicate 3				12:50	25	20.6	10.12	1212643.44	0.25	306127.22	0.31	2.75	0.87	17.88	
Group 2:	**Med. Gloss Non-flats**														
Product E	150 g/L	> 50g/L	H	11:53	25	10.5	10.41	1247393.11	0.13	160507.18	0.16	5.25	0.83	8.668	**10.47**
Replicate 2				13:47	25	14	10.41	1247393.11	0.17	214009.58	0.21	3.94	0.84	11.82	
Replicate 3				13:49	25	13	10.41	1247393.11	0.16	198723.18	0.20	4.24	0.84	10.91	
Product F	144 g/L	> 50g/L	H	12:09	25	22.5	10.4	1246194.84	0.28	343613.56	0.34	2.45	0.88	19.71	13.85
Replicate 2				14:04	25	14	10.4	1246194.84	0.17	213803.99	0.21	3.94	0.84	**11.82**	
Replicate 3				13:46	25	12	10.4	1246194.84	0.15	183260.57	0.18	4.60	0.83	**10.01**	
Product G	0 g/L	≤ 50g/L	L	13:11	25	18	11.12	1332469.87	0.22	293922.10	0.29	2.87	0.87	15.58	16.06
Replicate 2				13:05	25	22	11.12	1332469.87	0.27	359238.13	0.36	2.35	0.88	19.33	
Replicate 3				13:36	25	15.5	11.12	1332469.87	0.19	253099.59	0.25	3.33	0.86	13.26	
Product H	0 g/L	≤ 50g/L	L	9:03	25	34.5	10.13	1213841.71	0.42	513195.41	0.51	1.64	0.90	31.13	30.97
Replicate 2				8:47	25	35	10.13	1213841.71	0.43	520633.02	0.52	1.62	0.90	31.61	
Replicate 3				8:58	25	33.5	10.13	1213841.71	0.41	498320.18	0.50	1.69	0.90	30.16	
Group 3:	**Low Gloss Non-flats**														
Product I	150 g/L	> 50g/L	H	12:49	25	24	11.3	1354038.63	0.29	398239.89	0.40	2.12	0.89	21.25	23.01
Replicate 2				13:46	25	25	11.3	1354038.63	0.31	414833.22	0.41	2.03	0.89	22.21	
Replicate 3				10:12	25	28.5	11.3	1354038.63	0.35	472909.87	0.47	1.78	0.90	25.56	
Product J	112 g/L	> 50g/L	H	9:10	25	28	11.1	1330073.34	0.34	456389.82	0.46	1.85	0.89	25.05	25.85
Replicate 2				9:15	25	29.5	11.1	1330073.34	0.36	480839.28	0.48	1.75	0.90	26.49	

Replicate 3				9:43	25	29	11.1	1330073.34	0.36	472689.46	0.47	1.78	0.90	26.01	
Product K	<50 g/L	≤ 50g/L	L	9:45	25	28.5	11.2	1342055.99	0.35	468724.76	0.47	1.80	0.90	25.55	28.77
Replicate 2				8:44	25	32	11.2	1342055.99	0.39	526287.45	0.53	1.60	0.90	28.93	
Replicate 3				8:49	25	35	11.2	1342055.99	0.43	575626.89	0.58	1.46	0.91	31.85	
Product L	49 g/L	≤ 50g/L	L	10:18	25	30.5	10.5	1258177.49	0.37	470266.08	0.47	1.79	0.90	27.34	26.87
Replicate 2				9:33	25	28	10.5	1258177.49	0.34	431719.68	0.43	1.95	0.89	24.94	
Replicate 3				9:17	25	31.5	10.5	1258177.49	0.39	485684.64	0.49	1.74	0.90	28.31	

chart speed: (1in/min) / 1
elevator speed: 4 --> .05in/min
equilibrated 5 min (included in time)
R/r = 53.1666358
Ring circumference = 5.935cm
R = 0.94458458725cm (from C=pi*d)
R=0.009445845873m
R^3 = 0.842796192246 cm^3

1gram = 81.6 chart divisions
d= density of air at 100% rel. humidity =23g/m^3
1 gal = .003785411784 m^3
1lb = 453.59237 g

Note: Values of F for (R^3)/V values above 3.50 were extrapolated by plotting the data points from the given table and fitting with a logarithmic fit of equation: y=-0.0661Ln(x)+0.9351 where y=F, and x = (R^3)/V
For this fit, R^2 = 0.9998

Phase II Report

November 23, 2005

Executive Summary

Products Listing by Category

	Published VOC	Grouping	
Group 4:	**Primers/Sealers/Undercoaters**		
Product A2	142 g/L	>100 g/L	H
Product B2	125 g/L	>100 g/L	H
Product C2	63 g/L	≤100 g/L	L
Product D2	58 g/L	≤100 g/L	L
Group 5:	**Waterproofing & Concrete/Masonry Sealers**		
Product E2	390 g/L	> 100 g/L	H
Product F2	350 g/L	> 100 g/L	H
Product G2	92 g/L	≤100 g/L	L
Product H2	86 g/L	≤100 g/L	L
Product I2	< 65 g/L	≤100 g/L	L
Product J2	12 g/L	≤100 g/L	L
Product K2	270 g/L	> 100 g/L	H
Group 6:	**Exterior Stains**		
Product L2	250 g/L	>100 g/L	H
Product M2	0 g/L	≤100 g/L	L
Product N2	0 g/L	≤100 g/L	L
Product O2	0 g/L	≤100 g/L	L
Group 7:	**Clear Wood Finishes**		
Product P2	439 g/L	>275 g/L	H
Product Q2	347 g/L	>275 g/L	H
Product R2	250 g/L	≤275 g/L	L
Product S2	57 g/L	≤275 g/L	L
Product T2	50 g/L	≤275 g/L	L
Product U2	168 g/L	≤275 g/L	L

Number of Products Tested by Published VOC Range

Category	Products >100 g/L	Products ≤100 g/L
Primers/Sealers/Undercoaters	2	2
Concrete/Masonry	3	4
Exterior Stains	1	3

Category	Products >275 g/L	Products ≤275 g/L
Clear Wood Finishes	2	4

Tests for General Properties Summary

Percent Nonvolatile Summary*

	Published VOC	Grouping		Percent Nonvolatile Experimental
Group 4:	**Primers, Sealers, and Undercoaters**			
Product A2	142 g/L	>100 g/L	H	56.30
Product B2	125 g/L	>100 g/L	H	50.22
Product C2	63 g/L	≤100 g/L	L	54.48
Product D2	58 g/L	≤100 g/L	L	56.93
Group 5:	**Concrete/Masonry Sealers**			
Product E2	390 g/L	> 100 g/L	H	75.22
Product F2	350 g/L	> 100 g/L	H	25.54
Product G2	92 g/L	≤100 g/L	L	53.80
Product H2	86 g/L	≤100 g/L	L	19.03
Product I2	< 65 g/L	≤100 g/L	L	12.42
Product J2	12 g/L	≤100 g/L	L	3.55
Product K2	270 g/L	> 100 g/L	H	3.05
Group 6:	**Exterior Stains**			
Product L2	250 g/L	>100 g/L	H	62.78
Product M2	0 g/L	≤100 g/L	L	29.98
Product N2	0 g/L	≤100 g/L	L	23.24
Product O2	0 g/L	≤100 g/L	L	34.49
Group 7:	**Clear Wood Finishes**			
Product P2	439 g/L	>275 g/L	H	38.36
Product Q2	347 g/L	>275 g/L	H	64.88
Product R2	250 g/L	≤275 g/L	L	32.34
Product S2	57 g/L	≤275 g/L	L	31.74
Product T2	50 g/L	≤275 g/L	L	29.54
Product U2	168 g/L	≤275 g/L	L	32.61

*Average Values

Stability Summary

	Grouping	Stormer KU (original)	Stormer KU (post-test)	Overall Character**
Group 4:	**Primers, Sealers, Undercoaters**			
Product A2	H	106	110	8
Product B2	H	117	128	4
Product C2	L	113	123	6
Product D2	L	104	108	6
Group 5:	**Concrete/Masonry Sealers**			
Product E2	H	127	140	8
Product F2	H	< 53*	< 53*	8
Product G2	L	100	99	6
Product H2	L	< 53*	< 53*	10
Product I2	L	<53*	< 53*	8
Product J2	L	<53*	< 53*	8
Product K2	H	<53*	< 53*	6
Group 6:	**Exterior Stains**			
Product L2	H	<53*	< 53*	8
Product M2	L	58	62	8
Product N2	L	53	53	6
Product O2	L	55	55	6
Group 7:	**Clear Wood Finishes**			
Product P2	H	< 53*	< 53*	8
Product Q2	H	61	60	10
Product R2	L	55	57	10
Product S2	L	55	55	8
Product T2	L	< 53*	< 53*	10
Product U2	L	58	58	10

* A viscosity of "< 53" indicates that the given coating's viscosity is below the measurable range

**Overall Character – Ratings: 0-10; a rating of 0 denotes failure

Stability Summary - Gloss Measurements

	Grouping	20°Mean	20 SD	60°Mean	60 SD	85°Mean	85 SD
Group 4:	**Primers, Sealers, Undercoaters**						
Product A2	H	1.9	0.1	9.1	0.2	11.0	0.2
Product B2	H	3.2	0.1	18.6	0.4	34.3	0.2
Product C2	L	1.3	0.1	3.6	0.1	4.6	0.1
Product D2	L	2.2	0.1	10.4	0.2	10.2	0.2
Group 5:	**Concrete/Masonry Sealers**						
Product E2	H	N/A – Textured					
Product F2	H	*2.6*	*0.2*	*20.2*	*0.8*	*54.5*	*1.6*
Product G2	L	1.4	0.1	2.7	0.1	1.3	0.1
Product H2	L	*1.4*	*0.1*	*6.4*	*0.6*	*29.8*	*1.4*
Product I2	L	*1.6*	*0.2*	*8.6*	*1.0*	*42.4*	*3.4*
Product J2	L	*2.7*	*0.2*	*19.3*	*1.4*	*52.3*	*2.0*
Product K2	H	*1.5*	*0.1*	*7.3*	*1.0*	*37.8*	*1.8*
Group 6:	**Exterior Stains**						
Product L2	H	0.9	0.6	4.4	0.2	1.7	0.2
Product M2	L	66.0	0.4	85.4	0.2	94.9	0.6
Product N2	L	*8.8*	*1.0*	*40.7*	*2.4*	*50.2*	*2.8*
Product O2	L	*28.6*	*0.6*	*71.5*	*1.0*	*71.8*	*2.2*
Group 7:	**Clear Wood Finishes**						
Product P2	H	9.5	0.6	45.5	0.8	71.4	1.8
Product Q2	H	84.9	0.4	90.3	1.0	95.3	1.0
Product R2	L	5.2	1.2	24.4	2.0	36.0	1.0
Product S2	L	10.8	0.8	43.7	1.0	71.3	0.6
Product T2	L	64.7	1.4	84.7	0.6	89.4	0.6
Product U2	L	17.3	1.0	51.5	0.6	74.2	1.4

*Gloss values in italics were measured over the unsealed portion of the Leneta chart because a consistent film over the sealed portion was unattainable due to penetrating characteristics

Stormer and Cone and Plate Viscosities Summary*

	Grouping	Stormer (KU)		Cone and Plate (P)	
		Average	Temp. (°C)	Average	Temp (°C)
Group 4:	**Primers, Sealers, Undercoaters**				
Product A2	H	106	25	1.021	25
Product B2	H	117	25	2.363	25
Product C2	L	113	25	2.592	25
Product D2	L	104	25	0.925	25
Group 5:	**Concrete/Masonry Sealers**				
Product E2	H	127	25	N/A – Textured***	
Product F2	H	< 53	25	Not Applicable**	
Product G2	L	100	25	0.676	25
Product H2	L	< 53	25	Not Applicable**	
Product I2	L	< 53	25	Not Applicable**	
Product J2	L	< 53	25	Not Applicable**	
Product K2	H	< 53	25	Not Applicable**	
Group 6:	**Exterior Stains**				
Product L2	H	< 53	25	Not Applicable**	
Product M2	L	58	25	Not Applicable**	
Product N2	L	53	25	Not Applicable**	
Product O2	L	55	25	Not Applicable**	
Group 7:	**Clear Wood Finishes**				
Product P2	H	< 53	25	0.448	25
Product Q2	H	61	25	2.967	25
Product R2	L	56	25	0.327	25
Product S2	L	55	25	0.342	25
Product T2	L	< 53	25	Not Applicable**	
Product U2	L	58	25	0.426	25

*Spindle = 3 (Group 4), 2 (Product Q2), 1 (Group 5 and Group 7),

*Shear Rate = $12000s^{-1}$

*Average Values

**These coatings had viscosities below the measurable range of the instrument

***Textured coatings cannot be tested with the cone and plate viscometer

Freeze-Thaw Resistance: Pass/Fail Summary*

	Grouping	After 1 Cycle	After 3 Cycles	After 5 Cycles	After 8 Cycles
Group 4:	**Primers, Sealers, and Undercoaters**				
Product A2	H	Pass	Pass	Pass	Pass
Product B2	H	Fail	Fail	Fail	Fail
Product C2	L	Pass	Pass	Pass	Pass
Product D2	L	Fail	Fail	Fail	Fail
Group 5:	**Concrete/Masonry Sealers**				
Product E2	H	N/A – Solvent Based			
Product F2	H	Pass	Pass	Pass	Pass
Product G2	L	Pass	Pass	Pass	Pass
Product H2	L	Pass	Pass	Pass	Pass
Product I2	L	Pass	Pass	Pass	Pass
Product J2	L	Pass	Pass	Pass	Pass
Product K2	H	Pass	Pass	Pass	Pass
Group 6:	**Exterior Stains**				
Product L2	H	N/A – Solvent Based			
Product M2	L	Pass	Pass	Pass	Pass
Product N2	L	Pass	Pass	Pass	Pass
Product O2	L	Fail	Fail	Fail	Fail
Group 7:	**Clear Wood Finishes**				
Product P2	H	N/A – Solvent Based			
Product Q2	H	N/A – Solvent Based			
Product R2	L	Pass	Pass	Pass	Pass
Product S2	L	Pass	Pass	Pass	Pass
Product T2	L	Fail	Fail	Fail	Fail
Product U2	L	Pass	Fail	Fail	Fail

*Average Values

Mechanical Dry Time Summary*

	Grouping	Set-Touch	Tack-Free	Dry-Hard	Dry-Through
Group 4:	**Primers, Sealers, and Undercoaters**				
Product A2	H	3.0	13.5	24.0	104.3
Product B2	H	5.3	18.0	27.8	87.0
Product C2	L	2.3	16.5	21.8	231.0
Product D2	L	1.5	10.5	69.0	85.5
Group 5:	**Concrete/Masonry Sealers**				
Product E2	H	N/A			
Product F2	H	N/A			
Product G2	L	15.0	75.0	144.8	156.0
Product H2	L	N/A			
Product I2	L	N/A			
Product J2	L	N/A			
Product K2	H	N/A			
Group 6:	**Exterior Stains**				
Product L2	H	N/A			
Product M2	L	N/A			
Product N2	L	N/A			
Product O2	L	N/A			
Group 7:	**Clear Wood Finishes**				
Product P2	H	24.0	30.8	45.0	282.0
Product Q2	H	94.5	130.5	249.0	> 6 Hours
Product R2	L	16.5	26.3	37.5	72.8
Product S2	L	8.3	30.8	63.8	131.3
Product T2	L	14.3	23.3	33.0	> 6 Hours
Product U2	L	11.3	15.0	27.0	34.5

*Average values; times in minutes; stylus diameter = 1mm; speed = 6 hours

Ambient Dry Time Summary*

	Grouping	Set-Touch	Dust-Free	Tack-Free	Dry-Hard	Dry-Through
Group 4:	**Primers, Sealers, and Undercoaters**					
Product A2	H	28	34	74	78	131
Product B2	H	17	21	62	65	69
Product C2	L	32	36	38	49	57
Product D2	L	23	28	35	43	51
Group 5:	**Concrete/Masonry Sealers**					
Product E2	H	N/A				
Product F2	H	N/A				
Product G2	L	N/A				
Product H2	L	N/A				
Product I2	L	N/A				
Product J2	L	N/A				
Product K2	H	N/A				
Group 6:	**Exterior Stains**					
Product L2	H	N/A				
Product M2	L	N/A				
Product N2	L	N/A				
Product O2	L	N/A				
Group 7:	**Clear Wood Finishes**					
Product P2	H	N/A				
Product Q2	H	N/A				
Product R2	L	N/A				
Product S2	L	N/A				
Product T2	L	N/A				
Product U2	L	N/A				

*Times are in minutes, and are the average of two samples

Gloss Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 4:	**Primers, Sealers, and Undercoaters**						
Product A2	H	1.9	0.1	7.8	0.2	8.2	0.2
Product B2	H	2.7	0.2	14.6	0.2	22.6	0.4
Product C2	L	1.3	0.1	3.3	0.2	4.4	0.2
Product D2	L	2.0	0.1	9.0	0.2	8.0	0.2
Group 5:	**Concrete/Masonry Sealers**						
Product E2	H	N/A - Textured					
Product F2	H	N/A – Penetrating					
Product G2	L	1.4	0.1	2.8	0.2	1.4	0.1
Product H2	L	N/A – Penetrating					
Product I2	L	N/A – Penetrating					
Product J2	L	N/A – Penetrating					
Product K2	H	N/A – Penetrating					
Group 6:	**Exterior Stains**						
Product L2	H	N/A – Penetrating					
Product M2	L	N/A – Penetrating					
Product N2	L	N/A – Penetrating					
Product O2	L	N/A – Penetrating					
Group 7:	**Clear Wood Finishes**						
Product P2	H	16.0	1.0	56.6	0.9	83.2	2.6
Product Q2	H	85.5	0.8	90.7	0.4	96.4	2.3
Product R2	L	7.5	1.5	31.4	3.0	47.0	3.0
Product S2	L	13.3	1.7	47.9	2.4	72.0	2.1
Product T2	L	52.8	5.0	80.5	1.0	92.5	1.2
Product U2	L	16.3	1.4	51.5	1.6	77.9	1.3

*Average values

Hide Summary – Contrast Ratio*

	Grouping	3 mil #1	3 mil #2	2 mil #1	2 mil #2
Group 4:	**Primers, Sealers, and Undercoaters**				
Product A2	H	0.96	0.96	0.96	0.95
Product B2	H	0.96	0.95	0.95	0.95
Product C2	L	0.92	0.92	0.92	0.91
Product D2	L	0.97	0.97	0.96	0.97
Group 5:	**Concrete/Masonry Sealers**				
Product E2	H	N/A – Texturing Prevents Bar Draw Downs			
Product F2	H	N/A – Penetrating			
Product G2	L	0.94	0.96	0.92	0.93
Product H2	L	N/A – Penetrating			
Product I2	L	N/A – Penetrating			
Product J2	L	N/A – Penetrating			
Product K2	H	N/A – Penetrating			
Group 6:	**Exterior Stains**				
Product L2	H	N/A – Penetrating			
Product M2	L	N/A – Penetrating			
Product N2	L	N/A – Penetrating			
Product O2	L	N/A – Penetrating			
Group 7:	**Clear Wood Finishes**				
Product P2	H	N/A - Clear			
Product Q2	H	N/A - Clear			
Product R2	L	N/A - Clear			
Product S2	L	N/A - Clear			
Product T2	L	N/A - Clear			
Product U2	L	N/A - Clear			

*Average values

Tests for Primers, Sealers and Undercoaters Summary

Adhesion Direct to Wood – Battelle Torque Summary*

	Grouping	Adhesion (lb/in^2)	Failure Mechanism
Group 4:	**Primers, Sealers, and Undercoaters**		
Product A2	H	23.7	Primer - Cohesive
Product B2	H	16.8	Primer - Cohesive
Product C2	L	20.8	Primer – Cohesive**
Product D2	L	19.5	Primer - Cohesive

*Average Values
**One sample had adhesion to substrate failure

Adhesion Direct to Wood – Cross-hatch Adhesion (ASTM D3359) Summary*

	Grouping	Rating	Failure Mechanism**
Group 4:	**Primers, Sealers, and Undercoaters**		
Product A2	H	3.7	Substrate Failure/Primer Adhesion
Product B2	H	3.7	Substrate Failure/Primer Adhesion
Product C2	L	4	Substrate Failure/Primer Adhesion
Product D2	L	4	Substrate Failure/Primer Adhesion

*Average Values
**All samples had both adhesion to substrate failure and substrate cohesive failure

Overcoat Adhesion – Battelle torque Summary

	Grouping	Adhesion (lb/in^2)	Failure Mechanism
Group 4:	**Primers, Sealers, and Undercoaters**		
Product A2	H	50.2	Substrate Failure**
Product B2	H	58.8	Substrate Failure
Product C2	L	50.0	Substrate Failure/Topcoat Adhesion***
Product D2	L	46.6	Topcoat Adhesion

*Average Values
**One sample had topcoat adhesion failure
***All three samples had substrate cohesive failure and topcoat adhesion failure

Overcoat Adhesion – Cross-hatch Adhesion (ASTM D3359) Summary*

	Grouping	Rating	Failure Mechanism
Group 4:	**Primers, Sealers, and Undercoaters**		
Product A2	H	4	Topcoat Adhesion
Product B2	H	4	Topcoat Adhesion/Primer Adhesion**
Product C2	L	3.3	Primer Adhesion***
Product D2	L	3.3	Topcoat Adhesion****

*Average Values
**These samples exhibited both topcoat adhesion failure and primer adhesion failure
***One sample also had substrate cohesive failure
****Two samples also had substrate failure

Stain Bleed Through Resistance, Color Change (ΔE) Summary*

	Lipstick	Red Crayon	Grape Juice	Mustard	Instant Coffee	Hot Pink Highlighter	Carbon Black
Group 4:	**Primers, Sealers, and Undercoaters**						
Product A2	3.70	2.23	1.40	2.49	9.31	9.07	1.64
Product B2	5.97	1.88	1.12	0.76	8.05	8.07	0.86
Product C2	1.51	0.59	2.23	0.60	14.29	6.42	1.14
Product D2	1.93	0.76	2.20	0.74	11.83	9.47	0.59

*Average values

Tannin Stain Resistance, Color Change (ΔE) Summary*

	Grouping	Pine	Cedar	Oak	Redwood
Group 4:	**Primers, Sealers, and Undercoaters**				
Product A2	H	1.93	3.64	4.89	6.98
Product B2	H	2.25	2.62	2.77	4.95
Product C2	L	3.99	4.03	4.44	6.08
Product D2	L	1.70	3.37	5.32	8.42

*Average Values

Grain Raising & Sandability Summary*

	Grouping	Grain Raising		Sandability	
		Oak	Pine	Oak	Pine
Group 4:	**Primers, Sealers, and Undercoaters**				
Product A2	H	1	2	Good	Good
Product B2	H	2	3	Good	Good
Product C2	L	1	2	Good	Good
Product D2	L	2	3	Good	Good

*Average Values

Enamel Holdout Summary*

	Group	20° Mean	20° SD	60° Mean	60° SD	85° Mean	85° SD
Group 4:	**Primers, Sealers, and Undercoaters**						
Product A2	H	12.9	0.7	51.9	1.0	53.7	0.7
Product B2	H	8.6	0.4	38.2	1.0	40.9	0.9
Product C2	L	7.7	0.4	37.7	1.3	42.1	1.1
Product D2	L	10.8	0.7	47.2	1.1	51.2	1.1
Standard							
Eco Brilliant		71.3	0.7	85.9	0.4	97.1	0.8

*Average Values

Flow/Level and Sag Summary*

	Grouping	Flow/Level	Sag
Group 4:	**Primers, Sealers and Undercoaters**		
Product A2	H	1	12+
Product B2	H	0	12+
Product C2	L	0	12+
Product D2	L	0	12+

*Average values

Tests for Waterproofing Concrete/Masonry Sealers Summary

Alkali, Acid, & Stain Resistance Visual Evaluation Summary*

	10% HCl	5%NaOH	Water	Motor Oil	Break Fluid	Transmission Fluid	Diesel Fuel
Group 5:							
Product E2	Slight Ring	None	None	None	None	Pink Stain	None
Product F2	White Powder	None	None	Stain and ppt**	Stain and ppt**	Stain and ppt**	Stain and ppt**
Product G2	Slight Yellow	None	None	Slightly Greasy	White Stain	Slight Pink Stain	Slight Yellow
Product H2	White Stain	Light Stain	Light Stain	Stain	Stain	Pink Stain	Stain
Product I2	White Stain	Light Stain	None	Stain	Stain	Pink Stain	Light Stain
Product J2	Bright White	Light Stain	None	Stain	Stain	Pink Stain	Light Stain
Product K2	White Stain	None	None	Stain	Stain	Light Stain	Very Light Stain

*Averages of visual inspections

**'ppt' means that a precipitate was formed on the surface

Alkali, Acid & Stain Resistance, Wine Spectrophotometer Evaluation Summary*

	X	Y	Z	ΔE
Group 5:	**Concrete/Masonry Sealers**			
Product E2	71.38/51.97	74.86/42.56	63.30/32.28	18.78
Product F2	42.75/33.52	44.89/34.39	41.45/29.62	8.53
Product G2	84.51/59.64	89.50/62.10	92.74/58.77	13.98
Product H2	38.04/28.36	39.76/29.16	35.29/23.95	8.79
Product I2	39.95/30.09	41.84/31.02	37.10/25.65	8.63
Product J2	41.84/23.13	44.04/23.56	42.74/19.68	17.83
Product K2	44.12/35.21	46.30/36.26	43.73/32.75	7.53

*Average Values; Left value is before staining, right value is after staining

Prohesion, Color Change (ΔE) Summary*

	Grouping	After 1 Cycle	After 2 Cycles	After 3 Cycles
Group 5:	**Concrete/Masonry Sealers**			
Product E2	H	2.04	1.88	1.37
Product F2	H	1.76	5.13	6.19
Product G2	L	0.47	0.60	0.62
Product H2	L	1.68	2.33	2.04
Product I2	L	1.36	2.67	3.37
Product J2	L	0.49	2.18	3.30
Product K2	H	1.67	1.60	3.04

*Average Values

Chloride/Nitrate Ion Screening Summary*

	Grouping	Chloride Level (ppm)	Nitrate Level (ppm)
Group 5:	**Concrete/Masonry Sealers**		
Product E2	H	0	5
Product F2	H	0	5
Product G2	L	0	5
Product H2	L	0	5
Product I2	L	0	5
Product J2	L	0	5
Product K2	H	0	5

*Average Values

Efflorescence Summary*

	Grouping	Rating
Group 5:	**Concrete/Masonry Sealers**	
Product E2	H	Slight
Product F2	H	Slight
Product G2	L	Slight
Product H2	L	Moderate
Product I2	L	Moderate
Product J2	L	Slight
Product K2	H	Slight

*Average Values

Water Vapor Transmission*

	Grouping	****Average Slope**	*****R^2 – 1**	*****R^2 – 2**	*****R^2 – 3**
Group 5:	**Concrete/Masonry Sealers**				
Product E2	H	-0.01043	0.9883	0.987	0.9991
Product F2	H	-0.04657	0.9986	1	0.9997
Product G2	L	-0.03493	1	0.9877	1
Product H2	L	-0.0408	0.9999	0.9982	0.9987
Product I2	L	-0.04757	0.9973	0.9999	1
Product J2	L	-0.06157	0.9998	0.9967	0.9997
Product K2	H	-0.0568	0.9995	0.9998	0.9997
Standard	---------	-0.05117	0.9931	0.9988	0.9991

*Slopes of plots are averaged, all R^2 values shown

**The slope of the linear fit line is the mass lost per unit of time

***R^2 is a correlation factor for the linear fit line used to determine slope; an R^2 values of 1 is considered to be a perfect correlation, an R^2 value of 0.99 or greater is an eProduct C2lent fit, 0.98 or higher is a good fit, and 0.97 or below is a poor fit.

Tests for Exterior Stains Summary

Stain Resistance, Color Change (ΔE) Summary*

	Grouping	Ketchup	Mustard	Wine	Carbon Black
Group 6:	**Exterior Stains**				
Product L2	H	1.71	1.88	1.58	16.75
Product M2	L	0.99	1.12	0.99	33.92
Product N2	L	0.39	1.06	0.98	24.62
Product O2	L	0.54	3.12	0.82	25.63

*Average Values

Direct Adhesion on Wood (ASTM D3359) Summary*

	Grouping	Rating	Failure Mechanism
Group 6:	**Exterior Stains**		
Product L2	H	N/A – Solvent	N/A – Solvent
Product M2	L	4	Substrate Failure
Product N2	L	3	Substrate Failure/Stain Adhesion**
Product O2	L	3.7	Substrate Failure/Stain Adhesion**

*Average Values

**All these samples had both substrate cohesive failure and stain adhesion failure

Taber Abrasion Summary*

	Grouping	I (Wear Index)	L (Weight Loss, mg)
Group 6:	**Exterior Stains**		
Product L2	H	94.42	37.77
Product M2	L	194.25	77.70
Product N2	L	136.92	54.77
Product O2	L	33.33	13.33

*Average Values

QUV Summary – Color Change*

	Grouping	ΔE, 200 Hours	ΔE, 400 Hours	ΔE, 600 Hours	ΔE, 800 Hours	ΔE, 1000 Hours
Group 6:	**Exterior Stains**					
Product L2	H	22.82	22.92	22.24	21.36	20.61
Product M2	L	19.12	19.36	17.62	16.93	16.46
Product N2	L	8.71	10.43	13.58	15.62	18.50
Product O2	L	26.63	26.40	26.74	24.65	22.41

*Average values

QUV Summary – Gloss: 0 Hours / 1000 Hours*

	Group	20°Mean	20 SD	60°Mean	60 SD	85°Mean	85 SD
Group 6:	**Exterior Stains**						
Product L2	H	0.8/0.5	0.1/0.1	2.5/1.8	0.2/0.1	1.1/1.3	0.2/0.1
Product M2	L	0.8/0.5	0.1/0.1	2.2/2.5	0.2/0.2	0.7/1.5	0.1/0.1
Product N2	L	0.8/0.4	0.1/0.1	2.4/1.8	0.2/0.1	0.6/1.0	0.2/0.1
Product O2	L	1.5/0.8	0.2/0.1	9.7/5.1	1.5/0.5	5.2/4.2	1.0/0.4

*All values written as: left value = 0 Hours value, right value = 1000 Hours value

*All values are averages

Tests for Clear Wood Finishes Summary

Friction Coefficient Summary*

	Grouping	Friction Coefficient
Group 7:	**Clear Wood Finishes**	
Product P2	H	0.45
Product Q2	H	0.76
Product R2	L	0.30
Product S2	L	0.39
Product T2	L	0.30
Product U2	L	0.45

*Average Values

Stain Resistance Summary*

	Water, Visual	Vodka, Visual	Wine, ΔE	Carbon Black, ΔE
Group 7:	**Clear Wood Finishes**			
Product P2	None	None	1.76	1.57
Product Q2	None	None	2.20	14.62
Product R2	None	Slight Ring	0.60	0.81
Product S2	None	None	0.89	6.08
Product T2	None	Slight Ring	1.31	2.48
Product U2	None	Stain-Gloss Change	0.34	4.16

*Average Values

Mar Resistance*

	Grouping	Percent Gloss Retention
Group 7:	**Clear Wood Finishes**	
Product P2	H	72.49
Product Q2	H	80.29
Product R2	L	69.98
Product S2	L	79.20
Product T2	L	55.73
Product U2	L	76.79

*Average Values

Taber Abrasion Summary*

	Grouping	I (Wear Index)	L (Weight Loss, mg)
Group 7:	**Clear Wood Finishes**		
Product P2	H	50.50	20.20
Product Q2	H	66.75	26.70
Product R2	L	36.83	14.73
Product S2	L	20.92	8.37
Product T2	L	77.33	30.93
Product U2	L	65.75	26.30

*Average Values

QUV Summary – Aluminum, Gloss: 0 Hours / 1000 Hours*

	Group	20°Mean	20 SD	60°Mean	60 SD	85°Mean	85 SD
Group 7:	**Clear Wood Finishes**						
Product P2	H	44.6/5.0	1.2/0.9	85.1/9.6	1.5/2.4	86.9/27.7	0.8/2.9
Product Q2	H	125.8/113.3	1.1/3.0	125.5/123.7	1.3/1.4	97.4/92.7	1.5/1.0
Product R2	L	25.9/1.4	1.0/0.2	51.4/3.5	1.0/0.7	46.1/4.0	0.6/1.2
Product S2	L	30.5/15.1	1.3/1.3	59.5/33.7	1.7/1.7	62.9/38.2	2.5/1.4
Product T2	L	108.0/24.1	6.3/2.5	120.7/50.4	1.4/4.6	92.0/67.5	2.6/5.5
Product U2	L	46.7/2.1	2.1/0.3	77.0/4.2	1.8/0.5	76.3/3.5	1.4/0.4

*All values written as: left value = 0 Hours value, right value = 1000 Hours value
*All values are averages

QUV Summary – Pine, Gloss: 0 Hours / 1000 Hours*

	Group	20°Mean	20 SD	60°Mean	60 SD	85°Mean	85 SD
Group 7:	**Clear Wood Finishes**						
Product P2	H	14.5/6.5	1.6/2.0	54.0/38.8	2.1/4.2	65.7/66.8	3.1/1.3
Product Q2	H	36.3/17.8	7.9/4.1	76.4/49.9	2.5/4.2	79.8/53.1	2.1/2.0
Product R2	L	16.7/7.9	0.6/0.9	52.2/36.7	2.7/2.5	64.5/56.8	2.5/2.1
Product S2	L	10.9/6.9	0.5/0.5	42.0/31.0	0.8/1.4	59.7/45.7	1.0/2.1
Product T2	L	14.0/8.3	1.9/2.2	44.9/32.8	1.5/4.9	48.4/37.2	4.0/5.2
Product U2	L	4.3/5.0	1.0/2.7	21.2/28.4	1.5/6.1	24.9/36.8	1.9/4.2

*All values written as: left value = 0 Hours value, right value = 1000 Hours value
*All values are averages

QUV Summary – Aluminum, Color Change*

	Grouping	ΔE, 200 Hours	ΔE, 400 Hours	ΔE, 600 Hours	ΔE, 800 Hours	ΔE, 1000 Hours
Group 7:	**Clear Wood Finishes**					
Product P2	H	11.09	15.08	18.21	19.12	16.53
Product Q2	H	5.22	5.16	5.88	6.48	6.01
Product R2	L	4.68	4.77	5.29	10.54	4.70
Product S2	L	1.90	2.21	3.17	3.48	3.54
Product T2	L	0.33	1.99	3.36	9.39	4.84
Product U2	L	1.29	3.38	5.14	10.22	4.09

*Average values

QUV Summary – Pine, Color Change*

	Grouping	ΔE, 200 Hours	ΔE, 400 Hours	ΔE, 600 Hours	ΔE, 800 Hours	ΔE, 1000 Hours
Group 7:	**Clear Wood Finishes**					
Product P2	H	20.30	26.38	30.16	29.70	27.20
Product Q2	H	8.66	12.91	15.96	17.78	18.72
Product R2	L	20.77	24.43	27.49	23.53	26.74
Product S2	L	19.89	23.95	26.50	27.27	28.01
Product T2	L	23.30	28.06	29.78	31.40	31.35
Product U2	L	23.77	28.41	30.28	32.06	31.26

*Average values

Flow/Level and Sag Summary*

	Grouping	Flow/Level	Sag
Group 7:	**Clear Wood Finishes**		
Product P2	H	10	< 3
Product Q2	H	10	< 3
Product R2	L	8.3	< 3
Product S2	L	9	< 3
Product T2	L	10	< 3
Product U2	L	10	< 3

*Average values

Task 1 - Testing Protocol

Tests for General Properties of all paints

Property	Standard	Number of Replicates	Substrate	Film Thickness/ Bar Type
Percent Solids	ASTM D2369-04	3	N/A	N/A
Stability	ASTM D1849-95	1	N/A	3mil/Bird bar
Stormer Viscosity	ASTM D562-01	2	N/A	N/A
Cone and Plate Viscosity	ASTM D4287-00	2	N/A	N/A
Freeze-Thaw Resistance	ASTM D2243-95	3	N/A	3 mil/Bird bar
Dry Time - Mechanical	ASTM D5895-03	2	Glass	3mil Cube Applicator
Dry Time	ASTM D1640-03	2	Glass	3mil/Bird bar
Gloss	ASTM D523-89	2	Leneta Card 1-B	3mil/Bird bar
Hide	Spectrophotometer	4	Leneta Card 1-B	3mil/Bird bar 2mil/Bird bar

Tests for Primers, Sealers, and Undercoaters

Property	Standard	Number of Replicates	Substrate	Film Thickness/ Bar type
Adhesion Direct to Wood	Battelle Torque & ASTM D3359	3	Pine	Coated by weight
Overcoat Adhesion	Battelle Torque & ASTM D3359	3	Pine	Coated by weight
Stain Bleed Resistance	Our Protocol	3 (of each stain)	Drywall	3 mil/Bird bar
Tannin Stain Resistance	ASTM D6686-01	3	Pine, Cedar, Oak, Redwood	Coated by weight
Grain Raising	Our Protocol	2	Pine and Oak	Coated by weight
Sandability	150 grit visual rating	2	Pine and Oak	Coated by weight
Enamel Holdout	Our Protocol	3	Drywall	3mil/Bird bar
Flow & Leveling	ASTM D4062	3	Leneta Card 1-B	NPCA Bar
Sag Resistance	ASTM D4400-99	3	Leneta Card 1-B	Anti-Sag Meter

Tests for Waterproofing Concrete/Masonry Sealers

Property	Standard	Number of Replicates	Substrate
Alkali, Acid & Stain Resistance	ASTM D1308	3	Concrete
Prohesion	ASTM G85 Annex A5	2	Concrete
Chloride Ion Screening	CHLOR*TEST	2	Concrete
Efflorescence	ASTM D7072-04	3	Concrete
Water Vapor Transmission	ASTM D1653	3	Leneta

Tests for Exterior Stains

Property	Standard	Number of Replicates	Substrate
Stain Resistance	ASTM D4828 (modified)	3	Pine
Adhesion on Wood	ASTM D3359	3	Pine
Taber Abrasion	ASTM D4060	3	Birch
QUV	ASTM D4587	3	Pine

Tests for Clear Wood Finishes

Property	Standard	Number of Replicates	Substrate	Film Thickness/ Bar type
Friction Coefficient	ASTM D2047	4	Pine	3 coats by brush
Stain Resistance	ASTM D1308	3	Pine	3 coats by brush
Mar Resistance	ASTM D6037	3	Birch	3 coats by brush
Taber Abrasion	ASTM D4060	3	Birch	3 coats by brush
QUV	ASTM D4587	2	Aluminum, Pine	Wirewound, 3 coats by brush
Flow & Leveling	ASTM D4062	3	Leneta Card 1-B	NPCA Bar
Sag Resistance	ASTM D4400-99	3	Leneta Card 1-B	Anti-Sag Meter

Performance of Testing

Tests for General Properties of All Paints

Percent Solids – ASTM D2369 is used.

Stability – ASTM D1849 is used with one sample of each being kept at 125°F for 30 days, followed by evaluation as indicated in the standard. Gloss measurements will also be taken of the samples during evaluation.

Stormer Viscosity – ASTM D562, method B, is used and provides a digital readout in KU.

Cone & Plate Viscosity – ASTM D4287 is used with the Brookfield CAP2000 model viscometer, using a number 3 spindle and a shear rate of $1200s^{-1}$.

Freeze-Thaw Resistance – ASTM D2243 is used for the water-borne paints for three samples of each with the paints applied to black and white Leneta charts after one, three, five, and eight cycles. A cycle is defined according to the ASTM method.

Dry Time – Mechanical Recorder – ASTM D5895 is used to determine dry time with a mechanical straight line drying time recorder.

Dry-Time – ASTM D1640 is used to determine dry time at room temperature.

Gloss – ASTM D523 is used with a BYK-Gardner micro-TRI-gloss meter calibrated just prior to use.

Hide – For dry hide and gloss, a three-mil Bird bar was used to apply paint to two black and white Leneta charts. Also, for hide, a two-mil Bird bar was used to apply paint to two black and white Leneta charts. The color was measured using a Minolta CM-2002 spectrophotometer and the CIE XYZ value for Y was recorded. The Y values over the white section and the black section were used to calculate dry hide. Due to Beer's and Lambert's Law, hide increases as film thickness increases. Hide also increases as concentration of hiding pigments increases.

Tests for Primers, Sealers, and Undercoaters

Adhesion Direct to Wood – The Battelle torque method and ASTM D3359 – Method B are used. The Battelle torque method measures the amount of parallel force required to break adhesion rather than perpendicular force (which the PATTI method measures). The coatings are applied by weight at the calculated spread rate to the substrate (wood) and allowed to dry for 7 days. The coating is then lightly sanded with 320 grit paper and a puck is adhered to the surface with an epoxy. The epoxy is allowed to dry for 24 hours and then the puck is removed with a digital torque wrench which converts torque to pounds per square inch (psi). ASTM D3359-Method B is also used to determine adhesion. This method uses a cutting tool and 3mm cutting guide to make a series of perpendicular cuts in the surface. Pressure sensitive tape in accordance with the ASTM procedure is then applied and removed after 90 seconds and the adhesion is qualitatively analyzed based on how much coating was removed by the tape.

Overcoat Adhesion – The Battelle torque method and ASTM D3359 – Method B are used. A red tinted Sherwin Williams ProMar 200 is used as the topcoat to evaluate the adhesion of a latex

paint to the primer on wood. The Battelle torque method measures the amount of parallel force required to break adhesion rather than perpendicular force (which the PATTI method measures). The coatings are applied by weight at the calculated spread rate to the substrate (wood) and allowed to dry for 7 days. The coating is then lightly sanded with 320 grit paper and a puck is adhered to the surface with an epoxy. The epoxy is allowed to dry for 24 hours and then the puck is removed with a digital torque wrench which converts torque to pounds per square inch (psi). ASTM D3359-Method B is also used to determine adhesion. This method uses a cutting tool and 3mm cutting guide to make a series of perpendicular cuts in the surface. Pressure sensitive tape in accordance with the ASTM procedure is then applied and removed after 90 seconds and the adhesion is qualitatively analyzed based on how much coating was removed by the tape.

Stain Bleed Resistance – Our protocol is used. Stain Bleed Resistance evaluates the ability of the coating to cover existing stains. Seven stains are applied in fixed amounts to drywall: lipstick, red crayon, grape juice, mustard, instant coffee, hot pink highlighter, carbon black. The stains are allowed to dry 24 hours, and then are top-coated with a 3mil drawdown of the primer/sealer/undercoater. The coatings are allowed to dry for 7 days and then are evaluated for color change using the Minolta CM-2002 spectrophotometer.

Tannin Stain Resistance – ASTM D6686-01 is used. This test evaluates a primer's ability to resist tannin bleed-through from wood substrates. Pine, cedar, oak, and redwood are used as the substrates. The panels are coated by weight, allowed to dry 24 hours in ambient conditions, and then are dried for two weeks at 50°C. The panels are then evaluated for color change relative to a leneta chart drawdown.

Grain Raising – Our protocol is used. Grain raising is an evaluation of the roughness of a coating after application over wood. To evaluate grain raising, pine and oak panels are sanded with 120 grit sandpaper and the dust is removed with a tack cloth. After 48 hours of equilibration, the panels are coated by weight and allowed to dry 48 hours before evaluation. The panels are evaluated for roughness by both visual and tactile ratings. The rating scale is: 1 (No grain raising, smooth and uniform), 2 (Slight grain raising, detectible visual/tactile surface grain), 3 (moderate grain raising, very visible/tactile), 4 (moderately severe, increased size of grain), and 5 (severe grain raising, very large grain, highly visible and obvious).

Sandability – A 150 grit visual rating is used. The sandability test is an evaluation of how well a coating responds to sanding after being applied to a wood substrate. The grain raising panels were used for the sandability test after grain raising evaluation. The panels were evaluated as to paper gumming (poor sandability) or powdering (good sandability).

Enamel Holdout – Our protocol is used. Enamel holdout evaluates how much the primer/sealer/undercoater affects the gloss of an applied topcoat. The primer/sealer/undercoater is applied to drywall using a 3mil drawdown bar. After 24 hours, the topcoat is cross-drawn (a drawdown perpendicular to the primer) and allowed to dry 7 days before gloss evaluation. The topcoat used is Eco Brilliant. A comparison is then made between the gloss of the topcoat over the primer and the gloss of the topcoat alone on a standard leneta chart.

Flow & Leveling – ASTM D4062 is used. This is an old ASTM method that is analgous to the New York Society for Paint Technology "Official Digest" No. 44 Vol. 32, No. 430, p. 1435. The NYPC Level Blade is used.

Sag – ASTM D4400 is used. A Leneta anti-sag bar is used to apply paint to a black and white Leneta chart. This bar deposits strips of paint from 3 to 12 mils thick approximately ½" wide. The chart is immediately lifted to a vertical position with the 12 mil thick strip at the bottom. Evaluation is based upon how much the strips flow into the strips below.

Tests for Waterproofing Concrete/Masonry Sealers

Alkali, Acid & Stain Resistance – ASTM D1308-02 – Covered Spot Test Method is used. The stains evaluated are acid (10% HCl), alkali (5% NaOH), distilled water, wine (spectrophotometer evaluation), motor oil, break fluid, transmission fluid, and diesel fuel. The concrete panels are coated with the sealers at the recommended spread rate and allowed to dry for 7 days. The panels are then stained with 1mL of each staining media. The stain is then covered with a watch glass. After 24 hours, the watch glass is removed and the stain is wiped with a clean paper towel and a very small amount of slightly soapy water. The panels are then allowed to dry and are evaluated for stain. All evaluations are visual except for the wine, which is evaluated with the Minolta CM-2002 Spectrophotometer.

Prohesion – ASTM G85 Annex A5 is used. The concrete panels are coated and allowed to dry for 7 days. The panels then undergo alternating exposure for two weeks per cycle. The first week of the cycle is 7 days in UV testing – 4 hours of UV, 4 hours of humidity. The second week of the cycle is 7 days in the salt fog chamber – 1 hour salt fog, 1 hour dry. After a full cycle (2 weeks), the panels are evaluated for color change with the Minolta CM-2002 Spectrophotometer. A total of 3 cycles are completed.

Chloride Ion Screening – The CHLOR*TEST is used. This test was developed by CHLOR*RID International and is an evaluation of the amount of chloride ions that is able to leach through the coating to the surface from the concrete. A nitrate test is also included. For more information: http://www.chlor-rid.com/chlor_test.htm .

Efflorescence – ASTM D7072-04 is used. This test uses green concrete (concrete that has not fully cured) which has been allowed to dry for 48 hours from when it was made. The concrete is then coated and dried for 24 hours. The coating is then placed in a constant humidity chamber for 48 hours. Upon removal, the coatings are evaluated for efflorescence.

Water Vapor Transmission – ASTM D1653 is used. This test evaluates how well a coating seals by measuring the transmission of water through the coating by weight per unit time. Copy paper is used as the substrate. For the penetrating coatings, a piece of paper for each coating is saturated with the coating. For the top-coat sealers, a 2mil drawdown is made on the paper. Three circles per paint are cut from the paper. The water permeability cups are filled with water and the paper is mounted in the holder, along with wax coated rings to seal it, and clamped in position. The cups are immediately weighed. After specific intervals, the cups are weighed until multiple data points are collected (4-6 data points). This data is then evaluated and graphed.

Tests for Exterior Stains

Stain Resistance – ASTM D4828 is modified for this test. This method is actually a washability test and provides information about the changes which occur as a result of sponge cleaning a stained area rather than the coating's likelihood of resisting a stain. To better determine the coating's resistance to staining, the coating is applied to three pine panels and allowed to dry for 7 days as described in the ASTM method. Color is measured on each panel using a Minolta CM-

2002 spectrophotometer and the CIE XYZ values are recorded. Four staining materials, ketchup, mustard, wine and carbon black, are applied with each panel having one stripe of each for a total of 4 stripes per panel, and 3 stripes of each stain per coating. The materials are left on the panels for 24 hours and then rinsed with de-ionized water and washed for 100 cycles manually with non-abrasive cleaner and a sponge according to the ASTM method. The panel is patted dry with paper towels to remove standing water, and is then allowed to air dry for one day. Then, color measurements are taken of the stripes with CIE XYZ values and ΔE values recorded.

Adhesion on Wood – ASTM D3359 is used. This method uses a cutting tool and 3mm cutting guide to make a series of perpendicular cuts in the surface. Pressure sensitive tape in accordance with the ASTM procedure is then applied and removed after 90 seconds and the adhesion is qualitatively analyzed based on how much coating was removed by the tape.

Taber Abrasion – ASTM D4060 is used. Birch Taber panels were used as the substrate and are coated and allowed to dry for 7 days. The coated panels are then run for 400 cycles with CS-17 wheels on a Taber Abraser. The weight loss due to abrasion is evaluated as a measure of abrasion resistance.

QUV – ASTM D4587 is used. The pine panels are subjected to UV and condensation cycles alternating every four hours. Every 200 hours total time, the panels are evaluated for gloss and color change and are rotated according to the standard used. The total time used is 1000 hours.

Tests for Clear Wood Finishes

Friction Coefficient – ASTM D2047 is used to determine the coefficient of friction of the coatings with a James Machine.

Stain Resistance – ASTM D1308-02 – Covered Spot Test Method is used. The staining media used are distilled water, wine, carbon black, and 50:50 ethanol:water (vodka equivalent). The panels are coated and allowed to dry for 7 days. The panels are then stained with 1mL of each staining media. The stain is then covered with a watch glass. After 24 hours, the watch glass is removed and the stain is wiped with a clean paper towel and a very small amount of slightly soapy water. The panels are then allowed to dry and are evaluated for stain. The water and vodka evaluations are visual and the wine and carbon black evaluations are done with the Minolta CM-2002 Spectrophotometer.

Mar Resistance – ASTM D6037 is used. Birch Taber panels are coated and allowed to dry and equilibrate. The gloss of the un-abraded panels is taken at 20° and the panels are abraded for 10 cycles. The gloss of the abraded panels is then recorded. The difference between the gloss readings is used to determine percent gloss retention.

Taber Abrasion – ASTM D4060 is used. Birch Taber panels were used as the substrate and are coated and allowed to dry for 7 days. The coated panels are then run for 400 cycles with CS-17 wheels on a Taber Abraser. The weight loss due to abrasion is evaluated as a measure of abrasion resistance.

QUV – ASTM D4587 is used. The aluminum and pine panels are subjected to UV and condensation cycles alternating every four hours. Every 200 hours total time, the panels are evaluated for gloss and color change and are rotated according to the standard used. The total time used is 1000 hours.

Flow & Leveling – ASTM D4062 is used. This is an old ASTM method that is analgous to the New York Society for Paint Technology "Official Digest" No. 44 Vol. 32, No. 430, p. 1435. The NYPC Level Blade is used.

Sag – ASTM D4400 is used. A Leneta anti-sag bar is used to apply paint to a black and white Leneta chart. This bar deposits strips of paint from 3 to 12 mils thick approximately ½" wide. The chart is immediately lifted to a vertical position with the 12 mil thick strip at the bottom. Evaluation is based upon how much the strips flow into the strips below.

Executive Summary

Phase III Report

Draft

12-16-05

Code Key

Codes	Published VOC	Grouping	
Group 8:	**Rust Preventative**		
RP1 (p)	345 g/L	> 100g/L	H
RP1 (t)	390 g/L	> 100g/L	H
RP2 (p)	340 g/L	> 100g/L	H
RP2 (t)	370 g/L	> 100g/L	H
RP3 (p)	58 g/L	≤ 100g/L	L
RP3 (t)	<50 g/L	≤ 100g/L	L
RP4 (p)	0 g/L	≤ 100g/L	L
RP4 (t)	0 g/L	≤ 100g/L	L
Group 9:	**Industrial Maintenance**		
IM2 (p)	163 g/L	> 100g/L	H
IM2 (i)	235 g/L	> 100g/L	H
IM2 (t)	<250 g/L	> 100g/L	H
IM3 (p)	0 g/L	≤ 100g/L	L
IM3 (i)	40 g/L	≤ 100g/L	L
IM3 (t)	66 g/L	≤ 100g/L	L
IM4 (p)	0 g/L	≤ 100g/L	L
IM4 (i)	0 g/L	≤ 100g/L	L
IM4 (t)	0 g/L	≤ 100g/L	L

Products Listing by Category

	Published VOC	Grouping	
Group 8:	**Rust Preventative**		
RP1 (p)	345 g/L	> 100g/L	H
RP1 (t)	390 g/L	> 100g/L	H
RP2 (p)	340 g/L	> 100g/L	H
RP2 (t)	370 g/L	> 100g/L	H
RP3 (p)	58 g/L	≤ 100g/L	L
RP3 (t)	<50 g/L	≤ 100g/L	L
RP4 (p)	0 g/L	≤ 100g/L	L
RP4 (t)	0 g/L	≤ 100g/L	L
Group 9:	**Industrial Maintenance**		
IM2 (p)	163 g/L	> 100g/L	H
IM2 (i)	235 g/L	> 100g/L	H
IM2 (t)	<250 g/L	> 100g/L	H
IM3 (p)	0 g/L	≤ 100g/L	L
IM3 (i)	40 g/L	≤ 100g/L	L
IM3 (t)	66 g/L	≤ 100g/L	L
IM4 (p)	0 g/L	≤ 100g/L	L
IM4 (i)	0 g/L	≤ 100g/L	L
IM4 (t)	0 g/L	≤ 100g/L	L

Number of Products Tested by Published VOC Range

Category	Products >100g/L	Products ≤100g/L
Rust Preventative	4	4

Industrial Maintenance	3	6

Number of Systems in each VOC range

Category	Systems >100g/L	Systems ≤100g/L
Rust Preventative	2	2
Industrial Maintenance	1	2

Tests for General Properties Summary

Percent Nonvolatile Summary*

	Published VOC	Grouping		Percent Nonvolatile Experimental
Group 8:	**Rust Preventatives**			
RP1 (p)	345 g/L	> 100g/L	H	75.61
RP1 (t)	390 g/L	> 100g/L	H	68.52
RP2 (p)	340 g/L	> 100g/L	H	76.11
RP2 (t)	370 g/L	> 100g/L	H	64.32
RP3 (p)	58 g/L	≤ 100g/L	L	51.21
RP3 (t)	<50 g/L	≤ 100g/L	L	26.92
RP4 (p)	0 g/L	≤ 100g/L	L	56.08
RP4 (t)	0 g/L	≤ 100g/L	L	Same as RP4 (p)
Group9:	**Industrial Maintenance**			
IM2 (p)	163 g/L	> 100g/L	H	77.37
IM2 (i)	235 g/L	> 100g/L	H	82.97
IM2 (t)	<250 g/L	> 100g/L	H	79.16
IM3 (p)	0 g/L	≤ 100g/L	L	79.83
IM3 (i)	40 g/L	≤ 100g/L	L	91.73
IM3 (t)	66 g/L	≤ 100g/L	L	62.85
IM4 (p)	0 g/L	≤ 100g/L	L	81.15
IM4 (i)	0 g/L	≤ 100g/L	L	98.37
IM4 (t)	0 g/L	≤ 100g/L	L	57.79

*Average Values

Stormer and Cone and Plate Viscosities Summary*

	Grouping	Stormer (KU)		Cone and Plate (P)	
		Average	Temp. (°C)	Average	Temp (°C)
Group 8:	**Rust Preventatives**				
RP1 (p)	H	86	25	4.412	25
RP1 (t)	H	91	25	4.921	25
RP2 (p)	H	86	25	2.946	25
RP2 (t)	H	87	25	4.154	25
RP3 (p)	L	104	25	0.464	25
RP3 (t)	L	82	25	N/A**	25
RP4 (p)	L	117	25	1.429	25
RP4 (t)	L	Same as RP4 (p)		Same as RP4 (p)	

Group 9:	**Industrial Maintenance**				
IM2 (p)	H	81	25	N/A***	25
IM2 (i)	H	107	25	14.350	25
IM2 (t)	H	117	25	17.183	25
IM3 (p)	L	122	25	N/A***	25
IM3 (i)	L	108	25	20.5165	25
IM3 (t)	L	120	25	1.851	25
IM4 (p)	L	74	25	N/A***	25
IM4 (i)	L	107	25	23.550	25
IM4 (t)	L	98	25	0.664	25

*Average Values

** N/A: readings were below range

***N/A: Coatings are slightly textured, readings cannot be obtained

Spindle = , Shear Rate = 12000s^{-1}

Mechanical Dry Time Summary*

	Grouping	**Set-Touch**	**Tack-Free**	**Dry-Hard**	**Dry-Through**
Group 8:	**Rust Preventatives**				
RP1 (p)	H	2	208	277	314
RP1 (t)	H	15	163	231	>450
RP2 (p)	H	29	105	157	296
RP2 (t)	H	46	179	213	>450
RP3 (p)	L	5	8	N/A**	N/A**
RP3 (t)	L	6	9	N/A**	N/A**
RP4 (p)	L	9	17	22	N/A**
RP4 (t)	L	Same as RP4 (p)			
Group 9:	**Industrial Maintenance**				
IM2 (p)	H	3	5	8	>450
IM2 (i)	H	2	209	319	>450
IM2 (t)	H	16	155	315	>450
IM3 (p)	L	2	9	14	>450
IM3 (i)	L	230	>450	--------	--------
IM3 (t)	L	22	200	276	>450
IM4 (p)	L	5	9	11	>450
IM4 (i)	L	238	>450	-------	--------
IM4 (t)	L	34	180	329	381

*Average values; times in minutes; stylus diameter = 1mm; speed = 6 hours

**The note “N/A” indicates that there was no discernable markings for this point because the coating finished drying before marks for this dry time could be obtained

Ambient Dry Time Summary*

	Grouping	**Set-Touch**	**Dust-Free**	**Tack-Free**	**Dry-Hard**	**Dry-Through**
Group 8:	**Rust Preventatives**					
RP1 (p)	H	59	85	193	892	1158
RP1 (t)	H	169	990	1075	1152	1809

RP2 (p)	H	117	152	197	244	635
RP2 (t)	H	119	707	1034	3797	3897
RP3 (p)	L	20	30	35	56	80
RP3 (t)	L	30	38	41	1021	1051
RP4 (p)	L	32	38	65	116	184
RP4 (t)	L	Same as RP4 (p)				
Group 9:	**Industrial Maintenance**					
IM2 (p)	H	19	22	25	34	40
IM2 (i)	H	98	138	219	836	926
IM2 (t)	H	22	77	824	841	884
IM3 (p)	L	18	23	26	31	51
IM3 (i)	L	664	724	751	1394	1434
IM3 (t)	L	187	250	660	1219	1244
IM4 (p)	L	22	25	28	29	43
IM4 (i)	L	671	748	803	1374	1419
IM4 (t)	L	169	244	600	1206	1228

*Times are in minutes, and are the average of two samples

Gloss Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 8:	**Rust Preventative**						
RP1 (p)	H	1.7	0.1	6.6	0.2	6.6	0.2
RP1 (t)	H	70.6	0.8	86.9	0.2	98.5	1.0
RP2 (p)	H	2.0	0.1	10.0	0.2	11.4	0.1
RP2 (t)	H	80.8	0.6	89.9	0.2	100.6	0.7
RP3 (p)	L	1.8	0.1	9.2	0.2	26.6	0.2
RP3 (t)	L	67.8	2.1	84.5	1.3	99.0	0.9
RP4 (p)	L	14.2	0.3	47.8	0.4	73.8	2.0
RP4 (t)	L	Same as RP4 (p)					
Group 9:	**Industrial Maintenance**						
IM2 (p)	H	0.4	0.1	1.4	0.2	8.7	0.4
IM2 (i)	H	6.4	0.4	44.0	0.7	88.3	0.8
IM2 (t)	H	50.2	1.3	81.6	0.4	97.6	0.4
IM3 (p)**	L	*0.3*	*0.1*	*0.7*	*0.1*	*1.1*	*0.1*
IM3 (i)	L	96.0	0.7	98.6	0.6	101.8	1.1
IM3 (t)	L	47.8	1.9	84.2	1.7	82.4	2.2
IM4 (p)	L	0.3	0.1	1.0	0.1	3.1	0.1
IM4 (i)	L	98.6	0.4	99.3	0.4	101.1	0.7
IM4 (t)	L	69.3	1.2	86.0	1.3	99.3	1.5

*Average values

**This coating did not adhere to the sealed portion of the chart, so gloss readings were taken over the unsealed portion

Hide Summary – Contrast Ratio*

	Grouping	3 mil #1	3 mil #2	2 mil #1	2 mil #2
Group 8:	**Rust Preventatives**				
RP1 (p)	H	0.97	0.97	0.95	0.95
RP1 (t)	H	0.98	0.97	0.97	0.97
RP2 (p)	H	0.96	0.96	0.93	0.93
RP2 (t)	H	0.97	0.97	0.95	0.95
RP3 (p)	L	0.97	0.97	0.95	0.95
RP3 (t)	L	N/A – Clear Coating			
RP4 (p)	L	0.99	0.99	0.97	0.96
RP4 (t)	L	Same as RP4 (p)			
Group 9:	**Industrial Maintenance**				
IM2 (p)	H	1.06	0.99	1.05	0.97
IM2 (i)	H	0.05	0.05	0.04	0.04
IM2 (t)	H	0.99	0.99	0.99	0.98
IM3 (p)	L	N/A – No Adhesion to Sealed Portion of Chart			
IM3 (i)	L	1.00	1.00	0.99	0.99
IM3 (t)	L	0.99	0.99	0.98	0.97
IM4 (p)	L	0.98	0.99	0.99	1.01
IM4 (i)	L	0.93	0.94	0.87	0.90

IM4 (t)	L	0.97	0.97	0.95	0.96

*Average values

Tests for Rust Preventative Coatings Summary

Taber Abrasion Summary*

	Grouping	I, Wear Index	L, Weight Loss, mg
Group 8:	**Rust Preventative**		
RP1 (p/t)	H	87.92	35.17
RP2 (p/t)	H	74.67	29.87
RP3 (p/t)	L	36.75	14.70
RP4 (p/t)	L	64.17	25.67

*Average Values

Impact Resistance Summary*

	Grouping	Last Pass	First Fail
Group 8:	**Rust Preventative**		
RP1 (p/t)	H	40	50
RP2 (p/t)	H	97	107
RP3 (p/t)	L	100	110
RP4 (p/t)	L	40	50

*Average Values

Adhesion on Steel Summary*

		PATTI		Battelle	
	Grouping	Adhesion (psi)	Failure Mechanism	Adhesion (psi)	Failure Mechanism
Group 8:	**Rust Preventative**				
RP1 (p/t)	H	1121.0	Co-90%, Ad – 10%	3383.1	Co-95%, Ad – 5%
RP2 (p/t)	H	746.8	Co-77%, Ad – 23%	2759.7	Co – 90%, Ad – 10%
RP3 (p/t)	L	733.2	Co-32%, Ad-68%	3370.9	Co – 38%, Ad – 62%
RP4 (p/t)	L	661.8	Co-23%, Ad-77%	2255.8**	100% Adhesion

*Average Values; 'Co' = Cohesive Failure, 'Ad' = Adhesion Failure

**This number is the average of two samples because the third puck experienced epoxy failure and was not pulled

Flow/Level Summary*

	Published VOC	Grouping		Flow/Level
Group 8:	**Rust Preventatives**			
RP1 (p)	345 g/L	> 100g/L	H	1
RP1 (t)	390 g/L	> 100g/L	H	5
RP2 (p)	340 g/L	> 100g/L	H	5
RP2 (t)	370 g/L	> 100g/L	H	9
RP3 (p)	58 g/L	≤ 100g/L	L	5
RP3 (t)	<50 g/L	≤ 100g/L	L	4
RP4 (p)	0 g/L	≤ 100g/L	L	1

RP4 (t)	0 g/L	≤ 100g/L	L	Same as RP4 (p)

*Average Values

Prohesion – Gloss – 0 Cycles Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 8:	**Rust Preventative**						
RP1 (p/t)	H	33.3	5.6	75.7	5.7	70.6	4.4
RP2 (p/t)	H	48.0	3.9	82.1	1.7	83.5	1.9
RP3 (p/t)	L	21.3	1.7	63.2	1.4	66.8	1.3
RP4 (p/t)	L	9.5	1.0	40.9	2.3	56.2	3.8

*Average Values

Prohesion – Gloss – 1 Cycle Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 8:	**Rust Preventative**						
RP1 (p/t)	H	3.0	0.5	32.4	1.9	64.8	2.5
RP2 (p/t)	H	3.3	0.4	23.5	2.8	63.5	1.7
RP3 (p/t)	L	2.2	0.2	14.2	0.6	32.8	2.7
RP4 (p/t)	L	7.0	0.7	33.5	1.3	49.9	2.6

*Average Values

Prohesion – Gloss – 2 Cycles Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 8:	**Rust Preventative**						
RP1 (p/t)	H	1.2	0.1	10.0	0.6	46.3	1.4
RP2 (p/t)	H	1.1	0.1	5.2	0.6	41.8	1.5
RP3 (p/t)	L	1.4	0.1	4.6	0.4	23.1	1.7
RP4 (p/t)	L	6.4	1.4	33.2	3.5	45.9	4.3

*Average Values

Flash Rusting Summary

Conical Mandrel Flexibility Summary*

	Grouping	Pass/Fail	Failure Distance**	Adhesion Pass/Fail (after pass)***
Group 8:	**Rust Preventative**			
RP1 (p/t)	H	Fail	5 1/16	----------
RP2 (p/t)	H	Fail	9/16	----------
RP3 (p/t)	L	Pass	---------	Pass
RP4 (p/t)	L	Pass	---------	Pass

*Average Values

**Failure distance is reported in inches and is extent of failure from narrow end of cone

***If the coating passed, the narrow end of the flexed coating was scored to check for adhesion failure

<u>Tests for Industrial Maintenance Coatings Summary</u>

Taber Abrasion Summary

	Grouping	I, Wear Index	L, Weight Loss, mg
Group 8:	**Rust Preventative**		
IM2 (p/i/t)	H	76.00	30.40
IM3 (p/i/t)	L	38.35	15.34
IM4 (p/i/t)	L	65.00	26.00

Impact Resistance*

	Grouping	Last Pass	First Fail
Group 9:	**Industrial Maintenance**		
IM2 (p/i/t)	H	30	40
IM3 (p/i/t)	L	73	83
IM4 (p/i/t)	L	10	20

*Average Values; 4 pound weight used

Conical Mandrel Flexibility Summary*

	Grouping	Pass/Fail	Failure Distance**	Adhesion Pass/Fail (after pass)***
Group 9:	**Industrial Maintenance**			
IM2 (p/i/t)	H	Fail	4 19/32	----------
IM3 (p/i/t)	L	Fail	6****	----------
IM4 (p/i/t)	L	Fail	6****	---------

*Average Values

**Failure distance is reported in inches and is extent of failure from narrow end of cone

***If the coating passed, the narrow end of the flexed coating was scored to check for adhesion failure

****The panels are 6 inches long, so a failure of 6 inches indicates that the coating failed the entire length of the panel

Adhesion on Metal Summary*

		PATTI		Battelle	
	Grouping	Adhesion (psi)	Failure Mechanism	Adhesion (psi)	Failure Mechanism
Group 8:	**Industrial Maintenance**				
IM2 (p/i/t)	H	2160.7	Co – 30%,Ad –70%	3918.2	Co – 2%, Ad – 98%
IM3 (p/i/t)	L	2051.8	Co-2%, Ad-98%	3662.9	Co – 4%, Ad – 96%
IM4 (p/i/t)	L	2296.7	Co-3%, Ad – 97%	3531.1	Co – 3%, Ad – 97%

*Average Values

QUV – Gloss – 0 Hours Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	**Industrial Maintenance**						
IM2 (p/i/t)	H	28.3	4.9	67.3	3.1	62.8	4.2
IM3 (p/i/t)	L	57.8	9.7	74.8	6.5	73.8	6.1
IM4 (p/i/t)	L	66.1	3.1	85.2	1.4	82.1	2.6

*Average Values

QUV – Gloss – 200 Hours Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	**Industrial Maintenance**						
IM2 (p/i/t)	H	25.2	3.3	64.5	5.0	64.1	3.5
IM3 (p/i/t)	L	48.4	3.5	80.6	4.2	74.1	3.7
IM4 (p/i/t)	L	48.4	2.9	79.7	1.1	85.6	1.7

*Average Values

QUV – Gloss – 400 Hours Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	**Industrial Maintenance**						
IM2 (p/i/t)	H	19.7	3.5	60.6	3.6	65.8	2.3
IM3 (p/i/t)	L	38.2	6.6	77.6	4.7	82.2	3.5
IM4 (p/i/t)	L	21.0	1.7	66.0	1.0	82.8	2.5

*Average Values

QUV – Gloss – 600 Hours Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	**Industrial Maintenance**						
IM2 (p/i/t)	H	6.1	1.1	42.3	3.5	61.6	2.8
IM3 (p/i/t)	L	31.8	3.3	75.4	3.9	76.6	1.8
IM4 (p/i/t)	L	7.7	0.3	49.3	1.9	82.0	2.7

*Average Values

QUV – Gloss 800 Hours Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	**Industrial Maintenance**						
IM2 (p/i/t)	H	1.9	0.1	24.1	1.7	63.7	1.4
IM3 (p/i/t)	L	31.9	2.6	67.9	2.5	78.1	3.7
IM4 (p/i/t)	L	3.6	0.2	34.1	0.7	78.6	1.8

*Average Values

QUV – Gloss 1000 Hours Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	**Industrial Maintenance**						
IM2 (p/i/t)	H	1.5	0.1	13.3	1.2	58.8	2.1
IM3 (p/i/t)	L	25.4	5.3	67.2	4.5	74.0	3.7
IM4 (p/i/t)	L	3.0	0.2	22.9	1.5	76.9	2.7

*Average Values

QUV – Color, ΔE Summary*

	Grouping	ΔE, 200 Hours	ΔE, 400 Hours	ΔE, 600 Hours	ΔE, 800 Hours	ΔE, 1000 Hours

Group 9:	Industrial Maintenance					
IM2 (p/i/t)	H	1.24	1.66	2.16	2.41	2.64
IM3 (p/i/t)	L	3.28	2.44	2.25	2.00	1.85
IM4 (p/i/t)	L	2.97	2.35	2.04	1.94	2.22

*Average Values

MEK Rubs Summary*

	Grouping	Gloss Loss
Group 9:	Industrial Maintenance	
IM2 (p/i/t)	H	After 15 Cycles
IM3 (p/i/t)	L	Gloss Loss
IM4 (p/i/t)	L	Trace Gloss Loss

*Average Values

Prohesion – Gloss – 0 Cycles Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	Industrial Maintenance						
IM2 (p/i/t)	H	29.3	3.8	70.0	3.1	69.2	1.7
IM3 (p/i/t)	L	48.2	3.3	83.2	2.3	77.3	2.0
IM4 (p/i/t)	L	60.9	3.4	84.9	1.2	79.6	2.1

*Average Values

Prohesion – Gloss – 1 Cycle Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	Industrial Maintenance						
IM2 (p/i/t)	H	27.0	3.9	62.4	5.9	60.1	3.9
IM3 (p/i/t)	L	32.6	4.1	64.9	1.8	67.4	3.4
IM4 (p/i/t)	L	39.8	2.3	71.0	1.1	72.1	3.5

*Average Values

Prohesion – Gloss – 2 Cycles Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	Industrial Maintenance						
IM2 (p/i/t)	H	17.7	3.3	55.0	2.6	59.1	3.1
IM3 (p/i/t)	L	23.7	1.9	60.1	1.6	66.4	2.3
IM4 (p/i/t)	L	14.0	1.3	52.6	1.5	68.8	2.0

*Average Values

Prohesion – Gloss – 3 Cycles Summary*

	Grouping	20°Mean	20° SD	60°Mean	60° SD	85°Mean	85° SD
Group 9:	Industrial Maintenance						
IM2 (p/i/t)	H	5.8	1.1	36.7	3.2	56.6	3.0
IM3 (p/i/t)	L	15.8	2.6	50.2	2.7	60.1	1.2
IM4 (p/i/t)	L	4.3	0.2	36.8	1.9	67.3	1.5

*Average Values

Prohesion – Color ΔE Summary*

	Grouping	ΔE, After 1 Cycle	ΔE, After 2 Cycles	ΔE, After 3 Cycles
Group 9:	**Industrial Maintenance**			
IM2 (p/i/t)	H	0.83	1.85	2.64
IM3 (p/i/t)	L	3.18	2.93	1.85
IM4 (p/i/t)	L	2.99	3.25	2.22

*Average Values

Task 1 - Testing Protocol

Tests for General Properties of all paints

Property	Standard	Number of Replicates	Substrate	Film Thickness/ Bar Type
Percent Solids	ASTM D2369-04	3	N/A	N/A
Stormer Viscosity	ASTM D562-01	2	N/A	N/A
Cone and Plate Viscosity	ASTM D4287-00	2	N/A	N/A
Dry Time - Mechanical	ASTM D5895-03	2	Glass	3mil Cube Applicator
Dry Time	ASTM D1640-03	2	Glass	3mil/Bird bar
Gloss	ASTM D523-89	2	Leneta Card 1-B	3mil/Bird bar
Hide	Spectrophotometer	4	Leneta Card 1-B	3mil/Bird bar 2mil/Bird bar

Tests for Rust Preventative Coatings

Property	Standard	Number of Replicates	Substrate	Film Thickness/ Bar type
Taber Abrasion	ASTM D4060	3	Steel Taber Panel	Coated by weight
Impact Resistance	ASTM D2794	3	Steel	Coated by weight
Adhesion on Steel (unprimed)	Batelle Torque Method	3	Steel	Coated by weight
Flow & Leveling	ASTM D4062	3	Leneta Card 1-B	
Prohesion	ASTM G85 Annex A5	3	Steel	Coated by weight
Flash Rusting	Our Protocol	3	Steel	Coated by weight
Flexibility	ASTM D522 Rev A	3	Cold Rolled Steel Q-panels	Coated by weight

Tests for Industrial Maintenance Coatings

Property	Standard	Number of Replicates	Substrate	Film Thickness/ Bar type
Taber Abrasion	ASTM D4060	3	Steel Taber panel	Coated by weight
Impact Resistance	ASTM D522 Rev A	3	Steel	Coated by weight
Adhesion on Steel (unprimed)	Batelle Torque Method	3	Steel	Coated by weight
QUV	ASTM D4587	3	Steel	Coated by weight
MEK Rubs	ASTM D4752	3	Steel	Coated by weight
Prohesion	ASTM G85 Annex A5	3	Steel	Co`ated by weight

Performance of Testing

Tests for General Properties of All Paints

Percent Solids – ASTM D2369 is used.

Stormer Viscosity – ASTM D562, method B, is used and provides a digital readout in KU.

Cone & Plate Viscosity – ASTM D4287 is used with the Brookfield CAP2000 model viscometer, using a number 3 spindle and a shear rate of $1200s^{-1}$.

Dry Time – Mechanical Recorder – ASTM D5895 is used to determine dry time with a mechanical straight line drying time recorder.

Dry-Time – ASTM D1640 is used to determine dry time at room temperature.

Gloss – ASTM D523 is used with a BYK-Gardner micro-TRI-gloss meter calibrated just prior to use.

Hide – For dry hide and gloss, a three-mil Bird bar was used to apply paint to two black and white Leneta charts. Also, for hide, a two-mil Bird bar was used to apply paint to two black and white Leneta charts. The color was measured using a Minolta CM-2002 spectrophotometer and the CIE XYZ value for Y was recorded. The Y values over the white section and the black section were used to calculate dry hide. Due to Beer's and Lambert's Law, hide increases as film thickness increases. Hide also increases as concentration of hiding pigments increases.

Tests for Rust Preventative Coatings

Taber Abrasion – ASTM D4060 is used. The samples are run for 400 cycles and weight loss is determined.

Impact Resistance – ASTM D2794 is used. A 4 pound weight is used, and the last value at which the coating passes and the first value at which the coating fails are recorded.

Adhesion on Steel – Batelle torque method is used as well as the PATTI adhesion test with an F-8.

Flow & Leveling – ASTM D4062 is used. This is an old ASTM method that is analgous to the New York Society for Paint Technology "Official Digest" No. 44 Vol. 32, No. 430, p. 1435. The NYPC Level Blade is used.

Prohesion – ASTM G85 Annex A5 is used. The coated panels are scored and exposed to UV/Condensation cycling (4 hour intervals) for one week and salt-fog for one week (a two week cycle) for a total of three cycles.

Flash Rusting – Our protocol is used. The panels are coated and placed in a chamber with humidity in excess of 90% for two hours and then are dried in ambient conditions and color measurements are taken.

Flexibility – ASTM D522 Rev A is used with a conical mandrel. Failure is measured as the distance the coating cracks from the narrow end of the conical mandrel. In addition, if a coating passes the flexibility test, it is scored to see if there are any underlying adhesion problems.

Tests for Industrial Maintenance Coatings

Taber Abrasion – ASTM D4060 is used. The samples are run for 400 cycles and weight loss is determined.

Flexibility – ASTM D522 Rev A is used with a conical mandrel. Failure is measured as the distance the coating cracks from the narrow end of the conical mandrel. In addition, if a coating passes the flexibility test, it is scored to see if there are any underlying adhesion problems.

Adhesion on metal – Batelle torque method is used as well as the PATTI adhesion test with an F-8.

QUV – ASTM D4587 is used. The aluminum panels are subjected to UV and condensation cycles alternating every four hours. Every 200 hours total time, the panels are evaluated for gloss and color change and are rotated according to the standard used. The total time used is 1000 hours.

MEK Rubs – ASTM D4752 is used.

Prohesion – ASTM G85 Annex A5 is used. The coated panels are scored and exposed to UV/Condensation cycling (4 hour intervals) for one week and salt-fog for one week (a two week cycle) for a total of three cycles.

Test Results

Tests for General Properties of All Paints

Percent Solids

	Pub. VOC	Grouping		3 Replicates Each						
Group 8:	**Rust Preventative**			**W1**	**W2**	**SA**	**V (%vol)**	**AVG V**	**N (%NV)**	**AVG N**
RP1 (p)	345 g/L	> 100g/L	H	1.5371	1.9287	0.5176	24.34	24.39	75.66	75.61
	Replicate 2			1.4958	1.9082	0.5458	24.44	----------	75.56	----------
	Replicate 3			1.5295	1.9008	0.4911	24.39	----------	75.61	----------
RP1 (t)	390 g/L	> 100g/L	H	1.5682	1.8858	0.4639	31.54	31.48	68.46	68.52
	Replicate 2			1.514	1.8498	0.491	31.61	----------	68.39	----------
	Replicate 3			1.5709	1.9438	0.5427	31.29	----------	68.71	----------
RP2 (p)	340 g/L	> 100g/L	H	1.5616	1.9788	0.548	23.87	23.89	76.13	76.11
	Replicate 2			1.5466	1.9609	0.5444	23.90	----------	76.10	----------
	Replicate 3			1.5438	1.9402	0.521	23.92	----------	76.08	----------
RP2 (t)	370 g/L	> 100g/L	H	1.5659	1.9307	0.5667	35.63	35.68	64.37	64.32
	Replicate 2			1.5546	1.8637	0.4805	35.67	----------	64.33	----------
	Replicate 3			1.5641	1.939	0.5833	35.73	----------	64.27	----------
RP3 (p)	58 g/L	≤ 100g/L	L	1.5744	1.842	0.5229	48.82	48.79	51.18	51.21
	Replicate 2			1.5671	1.8317	0.5158	48.70	----------	51.30	----------
	Replicate 3			1.5719	1.8524	0.5482	48.83	----------	51.17	----------
RP3 (t)	<50 g/L	≤ 100g/L	L	1.5606	1.6991	0.5145	73.08	73.08	26.92	26.92
	Replicate 2			1.5704	1.7055	0.5021	73.09	----------	26.91	----------
	Replicate 3			1.5707	1.7064	0.5038	73.06	----------	26.94	----------
RP4 (p)	0 g/L	≤ 100g/L	L	1.5773	1.9353	0.6383	43.91	43.92	56.09	56.08
	Replicate 2			1.5702	1.8437	0.4876	43.91	----------	56.09	----------
	Replicate 3			1.5667	1.8748	0.5495	43.93	----------	56.07	----------
RP4 (t)	0 g/L	≤ 100g/L	L	Same as RP4 (t)						
Group 9:	**Industrial Maintenance**			---------	---------	----------	----------	----------	----------	----------
IM2 (p)	163 g/L	> 100g/L	H	1.5861	2.0056	0.542	22.60	22.63	77.40	77.37
	Replicate 2			1.5893	2.0177	0.5538	22.64	----------	77.36	----------
	Replicate 3			1.5616	1.9589	0.5136	22.64	----------	77.36	----------
IM2 (i)	235 g/L	> 100g/L	H	1.5595	2.0787	0.6255	16.99	17.03	83.01	82.97
	Replicate 2			1.5397	1.9164	0.4541	17.04	----------	82.96	----------
	Replicate 3			1.5717	2.0551	0.5827	17.04	----------	82.96	----------
IM2 (t)	<250 g/L	> 100g/L	H	1.571	2.0218	0.5705	20.98	20.84	79.02	79.16
	Replicate 2			1.5456	1.9105	0.4618	20.98	----------	79.02	----------
	Replicate 3			1.5447	1.9869	0.5567	20.57	----------	79.43	----------
IM3 (p)	0 g/L	≤ 100g/L	L	1.5447	2.0312	0.6088	20.09	20.17	79.91	79.83
	Replicate 2			1.5376	1.9509	0.5172	20.09	----------	79.91	----------
	Replicate 3			1.5575	1.9232	0.459	20.33	----------	79.67	----------
IM3 (i)	40 g/L	≤ 100g/L	L	1.583	2.1595	0.6266	8.00	8.27	92.00	91.73
	Replicate 2			1.5225	2.0341	0.5586	8.41	----------	91.59	----------
	Replicate 3			1.5472	2.0229	0.5193	8.40	----------	91.60	----------
IM3 (t)	66 g/L	≤ 100g/L	L	1.5528	1.8802	0.5212	37.18	37.15	62.82	62.85
	Replicate 2			1.5318	1.8647	0.5295	37.13	----------	62.87	----------
	Replicate 3			1.565	1.885	0.509	37.13	----------	62.87	----------
IM4 (p)	0 g/L	≤ 100g/L	L	1.534	1.9015	0.4527	18.82	18.85	81.18	81.15
	Replicate 2			1.5672	1.9912	0.5234	18.99	----------	81.01	----------
	Replicate 3			1.5602	2.0713	0.6289	18.73	----------	81.27	----------
IM4 (i)	0 g/L	≤ 100g/L	L	1.5587	2.084	0.5335	1.54	1.63	98.46	98.37
	Replicate 2			1.5601	2.0482	0.4962	1.63	----------	98.37	----------

Replicate 3				1.5467	2.0921	0.555	1.73	----------	98.27	----------
IM4 (t)	0 g/L	≤ 100g/L	L	1.5191	1.8201	0.5208	42.20	42.21	57.80	57.79
Replicate 2				1.5154	1.8288	0.5426	42.24	----------	57.76	----------
Replicate 3				1.5545	1.8597	0.5278	42.18	----------	57.82	----------

Stormer Viscosity and Cone and Plate Viscosity

Dry Time – Mechanical Recorder

Dry-Time – Ambient

Gloss

	Pub. VOC	**Grouping**		**Gloss (5 readings per replicate)**					
Group 8:	**Rust Preventative**			**20°Mean**	**20°Std. Dev.**	**60° Mean**	**60°Std. Dev.**	**85° Mean**	**85°Std. Dev.**
RP1 (p)	345 g/L	> 100g/L	H	1.7	0.1	6.6	0.2	6.5	0.1
Replicate 2				1.7	0.1	6.6	0.2	6.6	0.2
Average				**1.7**	**0.1**	**6.6**	**0.2**	**6.6**	**0.2**
RP1 (t)	390 g/L	> 100g/L	H	71.2	0.6	86.8	0.2	97.8	0.8
Replicate 2				69.9	1	87	0.2	99.1	1.2
Average				**70.6**	**0.8**	**86.9**	**0.2**	**98.5**	**1.0**
RP2 (p)	340 g/L	> 100g/L	H	2	0.1	9.9	0.2	11.4	0.1
Replicate 2				2	0.1	10	0.2	11.3	0.1
Average				**2.0**	**0.1**	**10.0**	**0.2**	**11.4**	**0.1**
RP2 (t)	370 g/L	> 100g/L	H	81.1	0.6	90	0.2	100.1	0.6
Replicate 2				80.5	0.6	89.8	0.2	101	0.8
Average				**80.8**	**0.6**	**89.9**	**0.2**	**100.6**	**0.7**
RP3 (p)	58 g/L	≤ 100g/L	L	1.8	0.1	9.2	0.2	26.8	0.1
Replicate 2				1.8	0.1	9.2	0.1	26.4	0.2
Average				**1.8**	**0.1**	**9.2**	**0.2**	**26.6**	**0.2**
RP3 (t)	<50 g/L	≤ 100g/L	L	67.3	1.8	84.0	1.4	98.5	1.2
Replicate 2				68.3	2.4	84.9	1.2	99.5	0.6
Average				**67.8**	**2.1**	**84.5**	**1.3**	**99.0**	**0.9**
RP4 (p)	0 g/L	≤ 100g/L	L	14.4	0.2	48.3	0.4	73.6	1.4
Replicate 2				14.0	0.4	47.3	0.4	74.0	2.6
Average				**14.2**	**0.3**	**47.8**	**0.4**	**73.8**	**2.0**
RP4 (t)	0 g/L	≤ 100g/L	L	Same as RP4 (p)					
Group 9:	**Industrial Maintenance**			----------	----------	----------	----------	----------	--------
IM2 (p)	163 g/L	> 100g/L	H	0.3	0.1	1.3	0.2	7.2	0.6
Replicate 2				0.4	0.1	1.5	0.1	10.1	0.2
Average				**0.4**	**0.1**	**1.4**	**0.2**	**8.7**	**0.4**
IM2 (i)	235 g/L	> 100g/L	H	6.4	0.1	43.8	0.4	86.3	0.8
Replicate 2				6.4	0.6	44.1	1.0	90.3	0.8
Average				**6.4**	**0.4**	**44.0**	**0.7**	**88.3**	**0.8**
IM2 (t)	<250 g/L	> 100g/L	H	50.8	1.6	82.0	0.2	97.5	0.2
Replicate 2				49.5	1.0	81.1	0.6	97.6	0.6
Average				**50.2**	**1.3**	**81.6**	**0.4**	**97.6**	**0.4**
IM3 (p)	0 g/L	≤ 100g/L	L	*0.3*	*0.1*	*0.7*	*0.1*	*1.2*	*0.1*
Replicate 2				*0.2*	*0.1*	*0.7*	*0.1*	*1.0*	*0.1*

Average				***0.3***	***0.1***	***0.7***	***0.1***	***1.1***	***0.1***
IM3 (i)	40 g/L	≤ 100g/L	L	95.6	1.0	98.7	0.4	101.3	1.6
Replicate 2				96.3	0.4	98.4	0.8	102.2	0.6
Average				**96.0**	**0.7**	**98.6**	**0.6**	**101.8**	**1.1**
IM3 (t)	66 g/L	≤ 100g/L	L	47.7	1.0	85.6	0.4	88.6	1.6
Replicate 2				47.8	2.8	82.7	3.0	76.2	2.8
Average				**47.8**	**1.9**	**84.2**	**1.7**	**82.4**	**2.2**
IM4 (p)	0 g/L	≤ 100g/L	L	0.3	0.1	1.0	0.1	3.1	0.1
Replicate 2				0.3	0.1	1.0	0.1	3.1	0.1
Average				**0.3**	**0.1**	**1.0**	**0.1**	**3.1**	**0.1**
IM4 (i)	0 g/L	≤ 100g/L	L	97.6	0.6	98.9	0.2	101.8	1.0
Replicate 2				99.6	0.2	99.7	0.6	100.4	0.4
Average				**98.6**	**0.4**	**99.3**	**0.4**	**101.1**	**0.7**
IM4 (t)	0 g/L	≤ 100g/L	L	69.1	1.6	86.5	0.6	99.7	2.0
Replicate 2				69.4	0.8	85.5	2.0	98.9	1.0
Average				**69.3**	**1.2**	**86.0**	**1.3**	**99.3**	**1.5**

Hide

	VOC	Grouping		3mi l- 1			3mil - 2			2mil - 1			2mil - 2		
Group 8:	**Rust Preventative**			**Y (Black)**	**Y (White)**	**Cont. Rat.**	**Y (Black)**	**Y (White)**	**Cont. Rat.**	**Y (Black)**	**Y (White)**	**Cont. Rat.**	**Y (Black)**	**Y (White)**	**Cont. Rat.**
RP1 (p)	345 g/L	> 100g/L	H	81.95	84.50	0.97	81.82	84.49	0.97	80.58	84.71	0.95	80.43	84.69	0.95
Reading 2				82.00	84.54	0.97	81.99	84.52	0.97	80.96	84.65	0.96	80.63	84.71	0.95
Reading 3				82.06	84.61	0.97	81.97	84.51	0.97	80.63	84.66	0.95	80.95	84.65	0.96
Average				82.00	84.55	**0.97**	81.93	84.51	**0.97**	80.72	84.67	**0.95**	80.67	84.68	**0.95**
RP1 (t)	390 g/L	> 100g/L	H	81.79	82.68	0.99	81.84	83.87	0.98	81.98	84.19	0.97	81.92	84.15	0.97
Reading 2				81.29	83.34	0.98	81.75	84.81	0.96	81.86	84.26	0.97	81.87	84.07	0.97
Reading 3				80.72	83.13	0.97	82.29	85.29	0.96	81.77	84.53	0.97	81.84	84.32	0.97
Average				81.27	83.05	**0.98**	81.96	84.66	**0.97**	81.87	84.33	**0.97**	81.88	84.18	**0.97**
RP2 (p)	340 g/L	> 100g/L	H	76.18	79.68	0.96	76.49	79.69	0.96	74.42	80.13	0.93	73.83	80.14	0.92
Reading 2				76.14	79.64	0.96	76.18	79.58	0.96	74.07	80.02	0.93	74.14	79.95	0.93
Reading 3				76.43	79.68	0.96	76.58	79.70	0.96	74.18	80.06	0.93	74.37	80.17	0.93
Average				76.25	79.67	**0.96**	76.42	79.66	**0.96**	74.22	80.07	**0.93**	74.11	80.09	**0.93**
RP2 (t)	370 g/L	> 100g/L	H	80.97	83.75	0.97	80.98	83.68	0.97	80.51	84.98	0.95	79.99	84.77	0.94
Reading 2				80.74	83.60	0.97	81.02	83.66	0.97	80.54	85.03	0.95	80.72	84.86	0.95
Reading 3				80.92	83.62	0.97	81.41	83.87	0.97	80.64	85.04	0.95	80.38	84.93	0.95
Average				80.88	83.66	**0.97**	81.14	83.74	**0.97**	80.56	85.02	**0.95**	80.36	84.85	**0.95**
RP3 (p)	58 g/L	≤ 100g/L	L	88.60	91.90	0.96	88.63	91.22	0.97	86.38	90.34	0.96	85.74	90.18	0.95
Reading 2				88.46	91.07	0.97	88.32	91.12	0.97	86.41	90.50	0.95	85.90	90.40	0.95
Reading 3				88.47	91.00	0.97	88.69	91.22	0.97	86.14	90.46	0.95	86.12	90.19	0.95
Average				88.51	91.32	**0.97**	88.55	91.19	**0.97**	86.31	90.43	**0.95**	85.92	90.26	**0.95**
RP3 (t)	<50 g/L	≤ 100g/L	L	N/A - Clear Coating											
RP4 (p)	0 g/L	≤ 100g/L	L	86.25	86.86	0.99	86.58	86.70	1.00	84.38	86.54	0.98	83.60	86.05	0.97
Reading 2				86.26	87.65	0.98	86.39	86.91	0.99	84.36	86.49	0.98	83.65	86.17	0.97
Reading 3				85.89	87.39	0.98	86.02	87.30	0.99	83.97	86.47	0.97	83.56	88.54	0.94
Average				86.13	87.30	**0.99**	86.33	86.97	**0.99**	84.24	86.50	**0.97**	83.60	86.92	**0.96**
RP4 (t)	0 g/L	≤ 100g/L	L	Same as RP4 (p)											
				3mi l- 1			**3mil - 2**			**2mil - 1**			**2mil - 2**		
Group 9:	**Industrial Maint.**			**Y (Black)**	**Y (White)**	**Cont. Rat.**	**Y (Black)**	**Y (White)**	**Cont. Rat.**	**Y (Black)**	**Y (White)**	**Cont. Rat.**	**Y (Black)**	**Y (White)**	**Cont. Rat.**
IM2 (p)	163 g/L	> 100g/L	H	23.00	21.41	1.07	25.34	25.27	1.00	23.34	22.27	1.05	25.19	25.96	0.97
Reading 2				23.96	22.91	1.05	25.33	25.01	1.01	24.21	23.28	1.04	25.43	26.08	0.98
Reading 3				23.95	22.87	1.05	25.30	26.10	0.97	23.98	22.77	1.05	25.34	26.20	0.97
Average				23.64	22.40	**1.06**	25.32	25.46	**0.99**	23.84	22.77	**1.05**	25.32	26.08	**0.97**
IM2 (i)	235 g/L	> 100g/L	H	3.32	66.14	0.05	3.37	66.59	0.05	2.99	67.77	0.04	2.81	68.36	0.04
Reading 2				3.40	66.32	0.05	3.43	66.83	0.05	2.90	67.78	0.04	3.00	68.28	0.04

Reading 3				3.41	66.19	0.05	3.30	66.91	0.05	2.98	67.44	0.04	2.93	68.66	0.04
Average				3.38	66.22	**0.05**	3.37	66.78	**0.05**	2.96	67.66	**0.04**	2.91	68.43	**0.04**
IM2 (t)	<250 g/L	> 100g/L	H	80.18	80.58	1.00	80.35	80.89	0.99	79.56	80.53	0.99	79.40	80.80	0.98
Reading 2				80.36	80.73	1.00	79.93	80.77	0.99	79.40	80.24	0.99	79.21	80.68	0.98
Reading 3				80.54	81.17	0.99	79.81	81.22	0.98	79.94	80.42	0.99	79.47	80.93	0.98
Average				80.36	80.83	**0.99**	80.03	80.96	**0.99**	79.63	80.40	**0.99**	79.36	80.80	**0.98**
IM3 (p)	0 g/L	≤ 100g/L	L	N/A - No Adhesion to Sealed Portion											
IM3 (i)	40 g/L	≤ 100g/L	L	52.46	52.56	1.00	52.45	52.62	1.00	52.06	52.78	0.99	51.94	52.58	0.99
Reading 2				52.45	52.57	1.00	52.43	52.62	1.00	52.02	52.78	0.99	51.98	52.49	0.99
Reading 3				52.47	52.65	1.00	52.47	52.60	1.00	52.00	52.74	0.99	52.08	52.55	0.99
Average				52.46	52.59	**1.00**	52.45	52.61	**1.00**	52.03	52.77	**0.99**	52.00	52.54	**0.99**
IM3 (t)	66 g/L	≤ 100g/L	L	83.39	83.98	0.99	83.22	83.94	0.99	81.60	83.63	0.98	81.97	83.66	0.98
Reading 2				83.36	83.83	0.99	82.71	83.86	0.99	81.19	83.65	0.97	80.95	83.69	0.97
Reading 3				82.90	83.87	0.99	82.98	84.08	0.99	81.79	83.55	0.98	80.43	83.69	0.96
Average				83.22	83.89	**0.99**	82.97	83.96	**0.99**	81.53	83.61	**0.98**	81.12	83.68	**0.97**
IM4 (p)	0 g/L	≤ 100g/L	L	24.25	24.90	0.97	23.99	24.04	1.00	24.63	24.63	1.00	24.50	24.23	1.01
Reading 2				24.24	24.53	0.99	23.91	24.37	0.98	24.63	25.16	0.98	24.46	24.10	1.01
Reading 3				24.18	24.71	0.98	24.16	24.57	0.98	24.31	24.35	1.00	24.41	24.62	0.99
Average				24.22	24.71	**0.98**	24.02	24.33	**0.99**	24.52	24.71	**0.99**	24.46	24.32	**1.01**
IM4 (i)	0 g/L	≤ 100g/L	L	66.49	70.97	0.94	66.42	71.05	0.93	62.42	71.68	0.87	64.15	71.67	0.90
Reading 2				66.02	71.01	0.93	66.38	71.08	0.93	63.04	71.81	0.88	64.78	71.63	0.90
Reading 3				66.18	70.98	0.93	66.66	71.02	0.94	62.79	71.88	0.87	63.92	71.64	0.89
Average				66.23	70.99	**0.93**	66.49	71.05	**0.94**	62.75	71.79	**0.87**	64.28	71.65	**0.90**
IM4 (t)	0 g/L	≤ 100g/L	L	85.86	88.44	0.97	85.82	88.23	0.97	83.34	87.40	0.95	83.26	87.03	0.96
Reading 2				85.76	88.56	0.97	85.42	88.34	0.97	83.34	87.41	0.95	83.25	87.37	0.95
Reading 3				85.81	88.40	0.97	85.53	87.95	0.97	83.52	87.28	0.96	83.25	86.81	0.96
Average				85.81	88.47	**0.97**	85.59	88.17	**0.97**	83.40	87.36	**0.95**	83.25	87.07	**0.96**

Tests for Rust Preventative Coatings

Taber Abrasion

	Grouping								
Group 8:	**Rust Preventative**		**W1**	**W1,mg**	**W2**	**W2,mg**	**# Cycles**	**I(wear index)**	**L(weight loss),mg**
RP1 (p/t)	> 100g/L	H	69.5001	69500.1000	69.4735	69473.5000	400	66.50	26.60
Replicate 2			69.8702	69870.2000	69.8320	69832.0000	400	95.50	38.20
Replicate 3			69.8042	69804.2000	69.7635	69763.5000	400	101.75	40.70
Average								**87.92**	**35.17**
RP2 (p/t)	> 100g/L	H	69.2225	69222.5000	69.2009	69200.9000	400	54.00	21.60
Replicate 2			69.9350	69935.0000	69.8991	69899.1000	400	89.75	35.90
Replicate 3			70.3952	70395.2000	70.3631	70363.1000	400	80.25	32.10
Average								**74.67**	**29.87**
RP3 (p/t)	≤ 100g/L	L	69.5657	69565.7000	69.5557	69555.7000	400	25.00	10.00
Replicate 2			69.3965	69396.5000	69.3844	69384.4000	400	30.25	12.10
Replicate 3			69.8660	69866.0000	69.8440	69844.0000	400	55.00	22.00
Average								**36.75**	**14.70**
RP4 (p/t)	≤ 100g/L	L	70.5716	70571.6000	70.5551	70555.1000	400	41.25	16.50
Replicate 2			70.7334	70733.4000	70.6913	70691.3000	400	105.25	42.10
Replicate 3			70.5638	70563.8000	70.5454	70545.4000	400	46.00	18.40
Average								**64.17**	**25.67**

Impact Resistance

Group 8:	**Rust Preventative**		**Last Pass**	**First Fail**
RP1 (p/t)	> 100g/L	H	40	50
Replicate 2			40	50
Replicate 3			40	50
Average			**40**	**50**
RP2 (p/t)	> 100g/L	H	120	130
Replicate 2			110	120
Replicate 3			60	70
Average			**97**	**107**
RP3 (p/t)	≤ 100g/L	L	60	70
Replicate 2			110	120
Replicate 3			130	140
Average			**100**	**110**
RP4 (p/t)	≤ 100g/L	L	30	40
Replicate 2			60	70
Replicate 3			30	40
Average			**40**	**50**

Adhesion on Steel

			Patti			Battelle		
Group 8:	**Rust Preventative**		**Adhesion (psig)**	**Adhesion (psi)**	**Failure Mech.**	**Adhesion (in-lb)**	**Adhesion (psi)**	**Failure Mech.**
RP1 (p/t)	> 100g/L	H	51.2	1039.4	Co-95%, Ad-5%	86.9	3540.624526	Co-90%, Ad - 10%
Replicate 2			58	1182.2	Co-85%, Ad-15%	77.3	3149.485338	Co-96%, Ad - 4%
Replicate 3			56	1141.4	Co-90%, Ad-10%	84.9	3459.137195	Co-98%, Ad - 2%

Average			**55.1**	**1121.0**		**83.0**	**3383.1**	
RP2 (p/t)	> 100g/L	H	17.1	345.5	Co-75%, Ad-25%	59.8	2436.471193	Co-95%, Ad - 5%
Replicate 2			48.8	998.5	Co-75%, Ad-25%	58.1	2367.206962	Co-90%, Ad - 10%
Replicate 3			43.6	896.5	Co-80%, Ad-20%	85.3	3475.434661	Co-85%, Ad - 15%
Average			**36.5**	**746.8**		**67.7**	**2759.7**	
RP3 (p/t)	≤ 100g/L	L	28.6	590.4	Co-10%, Ad-90%	79.4	3235.047035	Co-15%, Ad - 85%
Replicate 2			42.8	876.1	Co-45%, Ad-55%	78.6	3202.452103	Co-50%, Ad - 50%
Replicate 3			35.5	733.2	Co-40%, Ad-60%	90.2	3675.078622	Co-50%, Ad - 50%
Average			**35.6**	**733.2**		**82.7**	**3370.9**	
RP4 (p/t)	≤ 100g/L	L	33.1	672.0	Co-30%, Ad-70%	54.5	2220.529766	Ad - 100%
Replicate 2			31.8	651.6	Co-15%, Ad-85%	47	1914.952275	Ad - 100%
Replicate 3			----------	----------	----------	64.6	2632.040787	Ad - 100%
Average			**32.5**	**661.8**		**55.4**	**2255.8**	

Flow & Leveling

	Pub. VOC	**Grouping**		**Flow/Level**			
Group 8:	**Rust Preventative**			**1**	**2**	**3**	**Avg**
RP1 (p)	345 g/L	> 100g/L	H	1	1	1	1
RP1 (t)	390 g/L	> 100g/L	H	4	5	5	5
RP2 (p)	340 g/L	> 100g/L	H	5	5	5	5
RP2 (t)	370 g/L	> 100g/L	H	9	9	9	9
RP3 (p)	58 g/L	≤ 100g/L	L	5	5	5	5
RP3 (t)	<50 g/L	≤ 100g/L	L	4	4	4	4
RP4 (p)	0 g/L	≤ 100g/L	L	1	1	1	1
RP4 (t)	0 g/L	≤ 100g/L	L	Same as RP4 (p)			

Prohesion – Gloss – 0 Cycles

	Grouping		**Gloss (5 readings per replicate) - Prohesion 0 Cycles**					
Group 8:	**Rust Preventative**		**20° Mean**	**20° Std. Dev.**	**60° Mean**	**60° Std. Dev.**	**85° Mean**	**85° Std. Dev.**
RP1 (p/t)	> 100g/L	H	32.6	4.6	76.3	2.8	71.1	1.2
Replicate 2			32.5	6.8	75.5	8.2	65.0	6.4
Replicate 3			34.7	5.4	75.2	6.0	75.8	5.6
Average			**33.3**	**5.6**	**75.7**	**5.7**	**70.6**	**4.4**
RP2 (p/t)	> 100g/L	H	58.9	3.2	85.7	2.2	83.7	2.0
Replicate 2			54.1	6.0	86.0	1.0	91.3	0.8
Replicate 3			30.9	2.4	74.6	1.8	75.6	2.8
Average			**48.0**	**3.9**	**82.1**	**1.7**	**83.5**	**1.9**
RP3 (p/t)	≤ 100g/L	L	20.6	1.8	61.8	1.0	66.3	1.4
Replicate 2			22.0	1.8	65.4	1.2	68.4	1.4
Replicate 3			21.2	1.6	62.3	2.0	65.8	1.2
Average			**21.3**	**1.7**	**63.2**	**1.4**	**66.8**	**1.3**
RP4 (p/t)	≤ 100g/L	L	10.9	1.0	45.1	1.0	59.7	2.0
Replicate 2			7.7	1.4	36.8	4.0	52.5	6.0
Replicate 3			9.8	0.6	40.7	2.0	56.3	3.4

Average	**9.5**	**1.0**	**40.9**	**2.3**	**56.2**	**3.8**

Prohesion – Gloss – 1 Cycle

	Grouping		Gloss (5 readings per replicate) - Prohesion 1 Cycle					
Group 8:	**Rust Preventative**		**20° Mean**	**20° Std. Dev.**	**60° Mean**	**60° Std. Dev.**	**85° Mean**	**85° Std. Dev.**
RP1 (p/t)	> 100g/L	H	0.9	0.1	20.1	2.0	62.0	0.6
Replicate 2			6.3	1.2	46.4	2.8	64.8	3.2
Replicate 3			1.9	0.2	30.7	1.0	67.5	3.6
Average			**3.0**	**0.5**	**32.4**	**1.9**	**64.8**	**2.5**
RP2 (p/t)	> 100g/L	H	5.8	0.6	35.3	5.0	74.6	1.6
Replicate 2			3.2	0.4	28.3	2.6	75.7	0.2
Replicate 3			0.9	0.1	7.0	0.8	40.2	3.4
Average			**3.3**	**0.4**	**23.5**	**2.8**	**63.5**	**1.7**
RP3 (p/t)	≤ 100g/L	L	2.3	0.2	15.5	0.6	30.0	3.2
Replicate 2			2.6	0.2	17.0	0.2	34.0	2.4
Replicate 3			1.6	0.1	10.1	1.0	34.5	2.4
Average			**2.2**	**0.2**	**14.2**	**0.6**	**32.8**	**2.7**
RP4 (p/t)	≤ 100g/L	L	9.0	0.8	35.6	0.2	52.6	2.2
Replicate 2			6.6	1.0	36.0	2.4	52.7	4.8
Replicate 3			5.4	0.2	29.0	1.4	44.3	0.8
Average			**7.0**	**0.7**	**33.5**	**1.3**	**49.9**	**2.6**

Prohesion – Gloss – 2 Cycles

	Grouping		Gloss (5 readings per replicate) - Prohesion 2 Cycles					
Group 8:	**Rust Preventative**		**20° Mean**	**20° Std. Dev.**	**60° Mean**	**60° Std. Dev.**	**85° Mean**	**85° Std. Dev.**
RP1 (p/t)	> 100g/L	H	1.3	0.1	13.6	1.0	47.7	1.4
Replicate 2			1.2	0.1	9.0	0.6	44.3	1.2
Replicate 3			1.2	0.1	7.5	0.2	46.8	1.6
Average			**1.2**	**0.1**	**10.0**	**0.6**	**46.3**	**1.4**
RP2 (p/t)	> 100g/L	H	1.2	0.1	9.3	1.6	50.4	2.2
Replicate 2			1.1	0.1	4.0	0.2	49.7	1.0
Replicate 3			1.0	0.2	2.3	0.1	25.2	1.4
Average			**1.1**	**0.1**	**5.2**	**0.6**	**41.8**	**1.5**
RP3 (p/t)	≤ 100g/L	L	1.3	0.1	4.3	0.2	19.1	1.0
Replicate 2			1.3	0.1	4.0	0.8	20.7	2.4
Replicate 3			1.5	0.1	5.6	0.2	29.5	1.6
Average			**1.4**	**0.1**	**4.6**	**0.4**	**23.1**	**1.7**
RP4 (p/t)	≤ 100g/L	L	7.0	1.4	35.2	3.2	50.6	2.6
Replicate 2			7.3	1.4	35.0	3.6	47.0	3.6
Replicate 3			4.8	1.4	29.4	3.6	40.0	6.6
Average			**6.4**	**1.4**	**33.2**	**3.5**	**45.9**	**4.3**

Flash Rusting

Flexibility

Group 8:	**Rust Preventative**		**Pass/Fail**	**Failure Dist. (in)**	**Adhesion Pass/Fail**
RP1 (p/t)	> 100g/L	H	Fail	4 3/4	---------

Replicate 2			Fail	5 3/16	---------
Replicate 3			Fail	5 1/4	---------
Average			**Fail**	**5 1/16**	---------
RP2 (p/t)	> 100g/L	H	Fail	6/8	---------
Replicate 2			Fail	3/8	---------
Replicate 3			Fail	5/8	---------
Average			**Fail**	**9/16**	---------
RP3 (p/t)	≤ 100g/L	L	Pass	---------	Pass
Replicate 2			Pass	---------	Pass
Replicate 3			Pass	---------	Pass
Average			**Pass**	**---------**	**Pass**
RP4 (p/t)	≤ 100g/L	L	Pass	---------	Pass
Replicate 2			Pass	---------	Pass
Replicate 3			Pass	---------	Pass
Average			**Pass**	**---------**	**Pass**

Tests for Industrial Maintenance Coatings

Taber Abrasion

Impact Resistance

Group 9:	**Industrial Maint.**		**Last Pass**	**First Fail**
IM2 (p/i/t)	> 100g/L	H	30	40
Replicate 2			20	30
Replicate 3			40	50
Average			**30**	**40**
IM3 (p/i/t)	≤ 100g/L	L	80	90
Replicate 2			70	80
Replicate 3			70	80
Average			**73**	**83**
IM4 (p/i/t)	≤ 100g/L	L	10	20
Replicate 2			10	20
Replicate 3			10	20
Average			**10**	**20**

Flexibility

Group 9:	**Industrial Maintenance**		**Pass/Fail**	**Failure Dist. (in)**	**Adhesion Pass/Fail**
IM2 (p/i/t)	> 100g/L	H	Fail	5	---------
Replicate 2			Fail	4 1/8	---------
Replicate 3			Fail	4 5/8	---------
Average			**Fail**	**4 19/32**	**---------**
IM3 (p/i/t)	≤ 100g/L	L	Fail	6	---------
Replicate 2			Fail	6	---------
Replicate 3			Fail	6	---------
Average			**Fail**	**6**	**---------**
IM4 (p/i/t)	≤ 100g/L	L	Fail	6	---------
Replicate 2			Fail	6	---------
Replicate 3			Fail	6	---------
Average			**Fail**	**6**	**---------**

Adhesion on Metal

			Patti			Battelle		
Group 9:	**Industrial Maint**		**Adhesion (psig)**	**Adhesion (psi)**	**Failure Mech.**	**Adhesion (in-lb)**	**Adhesion (psi)**	**Failure Mech.**
IM2 (p/i/t)	> 100g/L	H	59.8	2446.4	PAd-95%, Pco-5%	109	4441.1	Ad - 98%
Replicate 2			56.1	2283.1	PCo-70,PAd-30,IAd-5	80.9	3296.2	Ad - 98%
Replicate 3			42.6	1752.5	PAd-85, PCo-15%	98.6	4017.3	Ad - 98%
Average			**52.8**	**2160.7**		**96.2**	**3918.2**	
IM3 (p/i/t)	≤ 100g/L	L	80.6	3303.5	PCo-92,PAd-3,IAd-5	95.8	3903.2	Ad - 90%
Replicate 2			41.5	1711.7	PAd-98,IAd-2	93.5	3809.5	Ad - 99%
Replicate 3			28.4	1140.3	PCo-1,PAd-99	80.4	3275.8	Ad - 98%
Average			**50.2**	**2051.8**		**89.9**	**3662.9**	
IM4 (p/i/t)	≤ 100g/L	L	52.3	2119.8	PCo-4,PAd-96	89.9	3662.9	Ad - 100%
Replicate 2			62.5	2568.8	PCo-2,PAd-98	99.5	4054.0	Ad - 90%, EAd-10%
Replicate 3			53.9	2201.5	PCo-2,PAd-98	70.6	2876.5	Ad - 100%
Average			**56.2**	**2296.7**		**86.7**	**3531.1**	

QUV - Gloss – 0 Hours

	Grouping		**Gloss (5 readings per replicate) - QUV 0 Hours**					
Group 9:	**Industrial Maint.**		**20° Mean**	**20°Std. Dev.**	**60° Mean**	**60°Std. Dev.**	**85°Mean**	**85°Std. Dev.**
IM2 (p/i/t)	> 100g/L	H	27.7	4.0	66.8	3.4	64.3	3.8
Replicate 2			37.7	6.2	76.0	1.4	65.7	5.2
Replicate 3			19.5	4.4	59.2	4.6	58.5	3.6
Average			**28.3**	**4.9**	**67.3**	**3.1**	**62.8**	**4.2**
IM3 (p/i/t)	≤ 100g/L	L	60.3	12.6	78.1	8.0	68.7	8.8
Replicate 2			53.4	10.6	78.0	7.2	74.6	3.6
Replicate 3			59.8	6.0	68.2	4.4	78.1	5.8
Average			**57.8**	**9.7**	**74.8**	**6.5**	**73.8**	**6.1**
IM4 (p/i/t)	≤ 100g/L	L	64.6	3.4	85.1	2.4	83.3	3.0
Replicate 2			63.5	3.4	85.1	1.4	81.8	2.6
Replicate 3			70.3	2.6	85.3	0.4	81.2	2.2
Average			**66.1**	**3.1**	**85.2**	**1.4**	**82.1**	**2.6**

QUV – Gloss – 200 Hours

	Grouping		**Gloss (5 readings per replicate) - QUV 200 Hours**					
Group 9:	**Industrial Maint.**		**20° Mean**	**20°Std. Dev.**	**60° Mean**	**60°Std. Dev.**	**85° Mean**	**85°Std. Dev.**
IM2 (p/i/t)	> 100g/L	H	26.0	2.6	64.2	4.6	63.6	3.2
Replicate 2			27.8	5.8	69.8	3.4	62.9	4.2
Replicate 3			21.8	1.6	59.6	7.0	65.8	3.0
Average			**25.2**	**3.3**	**64.5**	**5.0**	**64.1**	**3.5**
IM3 (p/i/t)	≤ 100g/L	L	42.7	4.8	81.6	3.4	66.1	6.4
Replicate 2			50.0	2.8	80.6	6.8	69.0	2.4
Replicate 3			52.6	3.0	79.6	2.4	87.2	2.4
Average			**48.4**	**3.5**	**80.6**	**4.2**	**74.1**	**3.7**
IM4 (p/i/t)	≤ 100g/L	L	43.2	2.0	78.2	1.4	85.1	2.8
Replicate 2			50.2	3.4	79.9	1.0	88.9	2.2
Replicate 3			51.8	3.4	81.1	1.0	82.7	0.2
Average			**48.4**	**2.9**	**79.7**	**1.1**	**85.6**	**1.7**

QUV – Gloss – 400 Hours

	Grouping		Gloss (5 readings per replicate) - QUV 400 Hours					
Group 9:	**Industrial Maint.**		**20° Mean**	**20° Std. Dev.**	**60° Mean**	**60° Std. Dev.**	**85° Mean**	**85° Std. Dev.**
IM2 (p/i/t)	> 100g/L	H	16.0	3.4	63.0	2.0	67.2	1.6
Replicate 2			29.7	3.8	69.1	5.4	68.3	2.4
Replicate 3			13.5	3.2	49.8	3.4	62.0	2.8
Average			**19.7**	**3.5**	**60.6**	**3.6**	**65.8**	**2.3**
IM3 (p/i/t)	≤ 100g/L	L	42.3	8.0	78.1	6.2	76.7	3.4
Replicate 2			36.9	4.2	76.8	3.6	87.9	5.0
Replicate 3			35.5	7.6	77.8	4.4	82.1	2.2
Average			**38.2**	**6.6**	**77.6**	**4.7**	**82.2**	**3.5**
IM4 (p/i/t)	≤ 100g/L	L	11.4	2.2	58.6	2.0	80.9	3.2
Replicate 2			27.4	0.8	70.7	0.8	84.1	2.4
Replicate 3			24.3	2.0	68.7	0.1	83.4	1.8
Average			**21.0**	**1.7**	**66.0**	**1.0**	**82.8**	**2.5**

QUV – Gloss – 600 Hours

	Grouping		Gloss (5 readings per replicate) - QUV 600 Hours					
Group 9:	**Industrial Maint.**		**20° Mean**	**20° Std. Dev.**	**60° Mean**	**60° Std. Dev.**	**85° Mean**	**85° Std. Dev.**
IM2 (p/i/t)	> 100g/L	H	3.1	0.8	36.3	2.8	61.6	1.2
Replicate 2			12.3	2.0	57.0	3.8	62.7	3.4
Replicate 3			2.9	0.6	33.7	3.8	60.4	3.8
Average			**6.1**	**1.1**	**42.3**	**3.5**	**61.6**	**2.8**
IM3 (p/i/t)	≤ 100g/L	L	18.9	2.8	74.3	2.0	71.5	2.4
Replicate 2			34.9	1.2	74.7	4.0	78.6	1.8
Replicate 3			41.6	6.0	77.2	5.8	79.6	1.2
Average			**31.8**	**3.3**	**75.4**	**3.9**	**76.6**	**1.8**
IM4 (p/i/t)	≤ 100g/L	L	3.8	0.4	38.4	3.2	78.2	2.4
Replicate 2			10.1	0.4	55.8	1.4	84.4	2.6
Replicate 3			9.1	0.2	53.7	1.2	83.3	3.0
Average			**7.7**	**0.3**	**49.3**	**1.9**	**82.0**	**2.7**

QUV – Gloss – 800 Hours

	Grouping		Gloss (5 readings per replicate) - QUV 800 Hours					
Group 9:	**Industrial Maint.**		**20° Mean**	**20° Std. Dev.**	**60° Mean**	**60° Std. Dev.**	**85° Mean**	**85° Std. Dev.**
IM2 (p/i/t)	> 100g/L	H	1.4	0.1	18.4	1.2	64.3	1.2
Replicate 2			2.9	0.1	39.4	2.4	67.1	1.4
Replicate 3			1.4	0.1	14.6	1.6	59.6	1.6
Average			**1.9**	**0.1**	**24.1**	**1.7**	**63.7**	**1.4**
IM3 (p/i/t)	≤ 100g/L	L	33.7	1.0	64.6	2.2	71.7	3.2
Replicate 2			30.9	2.6	72.4	2.8	84.9	4.2
Replicate 3			31.1	4.2	66.6	2.6	77.6	3.6
Average			**31.9**	**2.6**	**67.9**	**2.5**	**78.1**	**3.7**
IM4 (p/i/t)	≤ 100g/L	L	3.0	0.2	24.5	1.2	72.9	2.0
Replicate 2			4.1	0.2	39.8	0.2	80.5	2.6
Replicate 3			3.6	0.1	37.9	0.8	82.3	0.8
Average			**3.6**	**0.2**	**34.1**	**0.7**	**78.6**	**1.8**

QUV – Gloss – 1000 Hours

	Grouping		Gloss (5 readings per replicate) - QUV 1000 Hours					
Group 9:	**Industrial Maint.**		**20° Mean**	**20° Std. Dev.**	**60° Mean**	**60° Std. Dev.**	**85° Mean**	**85° Std. Dev.**
IM2 (p/i/t)	> 100g/L	H	1.5	0.1	13.5	0.6	59.6	0.8
Replicate 2			1.5	0.1	18.1	2.4	62.8	3.0
Replicate 3			1.4	0.1	8.4	0.6	54.1	2.6
Average			**1.5**	**0.1**	**13.3**	**1.2**	**58.8**	**2.1**
IM3 (p/i/t)	≤ 100g/L	L	23.7	6.6	68.8	2.6	70.2	4.6
Replicate 2			26.8	4.6	65.2	6.0	73.1	4.6
Replicate 3			25.8	4.8	67.5	4.8	78.8	2.0
Average			**25.4**	**5.3**	**67.2**	**4.5**	**74.0**	**3.7**
IM4 (p/i/t)	≤ 100g/L	L	2.7	0.2	14.2	2.0	75.3	3.0
Replicate 2			3.1	0.2	28.9	1.6	77.7	3.2
Replicate 3			3.1	0.1	25.7	0.8	77.7	2.0
Average			**3.0**	**0.2**	**22.9**	**1.5**	**76.9**	**2.7**

QUV – Color

	Grouping		0 Hours			200 Hours				400 Hours				600 Hours			
Group 9:	**Industrial Maint.**		**X**	**Y**	**Z**	**X**	**Y**	**Z**	**ΔE**	**X**	**Y**	**Z**	**ΔE**	**X**	**Y**	**Z**	**ΔE**
IM2 (p/i/t)	> 100g/L	H	77.39	82.10	85.55	76.30	81.01	82.69	1.35	77.15	82.06	83.10	1.80	78.17	83.11	83.30	2.47
Replicate 2			77.58	83.31	86.60	77.73	82.49	84.48	1.00	77.77	82.58	83.88	1.48	78.40	83.29	84.47	1.56
Replicate 3			77.57	82.26	85.53	76.24	80.96	82.52	1.36	76.90	81.71	82.67	1.71	78.73	83.67	83.76	2.45
Average			**77.51**	**82.56**	**85.89**	**76.76**	**81.49**	**83.23**	**1.24**	**77.27**	**82.12**	**83.22**	**1.66**	**78.43**	**83.36**	**83.84**	**2.16**
IM3 (p/i/t)	≤ 100g/L	L	78.58	83.25	87.04	77.87	82.99	82.65	3.15	77.74	82.73	83.13	2.56	77.74	82.66	83.59	2.15
Replicate 2			78.00	82.67	86.10	76.87	81.99	80.91	3.45	77.28	82.23	82.54	2.35	76.02	80.84	81.35	2.30
Replicate 3			77.15	81.67	85.46	75.32	80.19	79.77	3.25	77.16	82.05	82.71	2.41	76.59	81.42	82.20	2.30
Average			**77.91**	**82.53**	**86.20**	**76.69**	**81.72**	**81.11**	**3.28**	**77.39**	**82.34**	**82.79**	**2.44**	**76.78**	**81.64**	**82.38**	**2.25**
IM4 (p/i/t)	≤ 100g/L	L	79.83	84.61	87.81	80.45	85.71	84.52	3.35	80.30	85.38	85.65	2.23	79.84	84.80	85.52	1.84
Replicate 2			82.79	87.80	90.57	79.68	84.78	84.18	2.71	79.58	84.59	84.42	2.46	80.21	85.22	85.47	2.06
Replicate 3			80.41	85.22	88.51	79.14	84.18	83.61	2.84	77.57	84.49	84.52	2.37	80.38	85.39	85.62	2.22
Average			**81.01**	**85.88**	**88.96**	**79.76**	**84.89**	**84.10**	**2.97**	**79.15**	**84.82**	**84.86**	**2.35**	**80.14**	**85.14**	**85.54**	**2.04**

QUV – Color, Continued

			800 Hours				1000 Hours			
Group 9:	**Industrial Maint.**		**X**	**Y**	**Z**	**ΔE**	**X**	**Y**	**Z**	**ΔE**
IM2 (p/i/t)	> 100g/L	H	79.19	84.11	84.18	2.67	78.33	83.22	83.11	2.69
Replicate 2			79.31	84.21	84.98	1.89	79.99	84.93	85.23	2.32
Replicate 3			78.65	83.49	83.23	2.66	78.62	83.53	82.97	2.90
Average			**79.05**	**83.94**	**84.13**	**2.41**	**78.98**	**83.89**	**83.77**	**2.64**
IM3 (p/i/t)	≤ 100g/L	L	77.87	82.75	84.02	1.89	77.81	82.70	83.82	2.00
Replicate 2			77.86	82.77	83.70	1.88	77.31	82.10	83.72	1.36
Replicate 3			77.84	82.74	83.70	2.24	77.36	82.20	83.12	2.20
Average			**77.86**	**82.75**	**83.81**	**2.00**	**77.49**	**82.33**	**83.55**	**1.85**
IM4 (p/i/t)	≤ 100g/L	L	80.51	85.49	86.29	1.84	83.19	88.38	88.51	2.84
Replicate 2			80.51	85.49	85.94	1.88	81.12	86.13	86.65	1.71
Replicate 3			81.03	86.04	86.48	2.10	81.29	86.31	86.74	2.12
Average			**80.68**	**85.67**	**86.24**	**1.94**	**81.87**	**86.94**	**87.30**	**2.22**

MEK Rubs

	Grouping		
Group 9:	**Industrial Maint.**		Gloss Loss
IM2 (p/i/t)	> 100g/L	H	After 15 Cycles
Replicate 2			After 15 Cycles
Replicate 3			After 15 Cycles
Average			**After 15 Cycles**
IM3 (p/i/t)	≤ 100g/L	L	Gloss Loss
Replicate 2			Gloss Loss
Replicate 3			Gloss Loss
Average			**Gloss Loss**
IM4 (p/i/t)	≤ 100g/L	L	Trace Gloss Loss
Replicate 2			Trace Gloss Loss
Replicate 3			Trace Gloss Loss
Average			**Trace Gloss Loss**

Prohesion – Gloss – 0 Cycles

	Grouping		Gloss (5 readings per replicate) - Prohesion 0 Cycles					
Group 9:	**Industrial Maint.**		**20° Mean**	**20° Std. Dev.**	**60° Mean**	**60° Std. Dev.**	**85° Mean**	**85° Std. Dev.**
IM2 (p/i/t)	> 100g/L	H	30.0	3.0	70.9	1.2	71.3	0.8
Replicate 2			31.8	3.4	69.3	3.8	70.9	3.2
Replicate 3			26.0	5.0	69.7	4.4	65.3	1.0
Average			**29.3**	**3.8**	**70.0**	**3.1**	**69.2**	**1.7**
IM3 (p/i/t)	≤ 100g/L	L	39.9	3.0	81.6	3.2	72.0	2.8
Replicate 2			46.2	1.4	82.6	1.4	89.2	2.8
Replicate 3			58.5	5.6	85.3	2.2	70.7	0.4
Average			**48.2**	**3.3**	**83.2**	**2.3**	**77.3**	**2.0**
IM4 (p/i/t)	≤ 100g/L	L	64.5	5.2	86.1	0.4	81.4	3.6
Replicate 2			51.4	0.8	83.7	1.6	85.7	1.6
Replicate 3			66.7	4.2	85.0	1.6	71.7	1.0
Average			**60.9**	**3.4**	**84.9**	**1.2**	**79.6**	**2.1**

Prohesion – Gloss – 1 Cycle

	Grouping		Gloss (5 readings per replicate) - Prohesion 1 Cycle					
Group 9:	**Industrial Maint.**		**20° Mean**	**20° Std. Dev.**	**60° Mean**	**60° Std. Dev.**	**85° Mean**	**85° Std. Dev.**
IM2 (p/i/t)	> 100g/L	H	28.3	3.4	64.4	6.4	63.2	3.8
Replicate 2			26.5	4.6	65.7	5.0	64.6	1.4
Replicate 3			26.2	3.8	57.1	6.4	52.4	6.6
Average			**27.0**	**3.9**	**62.4**	**5.9**	**60.1**	**3.9**
IM3 (p/i/t)	≤ 100g/L	L	29.2	5.0	55.9	0.8	66.2	4.8
Replicate 2			29.5	5.0	67.5	1.0	65.8	2.8
Replicate 3			39.0	2.4	71.4	3.6	70.1	2.6
Average			**32.6**	**4.1**	**64.9**	**1.8**	**67.4**	**3.4**
IM4 (p/i/t)	≤ 100g/L	L	33.3	0.8	67.8	1.2	68.3	5.6
Replicate 2			38.3	4.0	73.5	1.2	80.9	1.4
Replicate 3			47.9	2.2	71.7	0.8	67.0	3.6
Average			**39.8**	**2.3**	**71.0**	**1.1**	**72.1**	**3.5**

Prohesion – Gloss – 2 Cycles

	Grouping	Gloss (5 readings per replicate) - Prohesion 2 Cycles

Group 9:	Industrial Maint.		20° Mean	20° Std. Dev.	60° Mean	60° Std. Dev.	85° Mean	85° Std. Dev.
IM2 (p/i/t)	> 100g/L	H	17.7	4.4	57.6	2.8	61.2	3.6
Replicate 2			18.5	1.8	55.8	3.0	61.8	2.6
Replicate 3			16.9	3.6	51.7	2.0	54.4	3.2
Average			**17.7**	**3.3**	**55.0**	**2.6**	**59.1**	**3.1**
IM3 (p/i/t)	≤ 100g/L	L	26.0	2.6	60.4	2.4	61.3	3.2
Replicate 2			29.6	2.0	57.4	1.8	75.6	1.8
Replicate 3			15.6	1.2	62.5	0.6	62.4	1.8
Average			**23.7**	**1.9**	**60.1**	**1.6**	**66.4**	**2.3**
IM4 (p/i/t)	≤ 100g/L	L	12.0	1.4	49.4	1.8	65.5	2.6
Replicate 2			14.0	1.8	55.1	1.4	74.0	2.4
Replicate 3			15.9	0.8	53.4	1.2	66.8	1.0
Average			**14.0**	**1.3**	**52.6**	**1.5**	**68.8**	**2.0**

Prohesion – Gloss – 3 Cycles

	Grouping		Gloss (5 readings per replicate) - Prohesion 3 Cycles					
Group 9:	Industrial Maint.		20° Mean	20° Std. Dev.	60° Mean	60° Std. Dev.	85° Mean	85° Std. Dev.
IM2 (p/i/t)	> 100g/L	H	5.3	1.2	34.8	4.0	58.0	1.6
Replicate 2			5.9	0.2	38.1	2.6	61.6	2.6
Replicate 3			6.1	2.0	37.1	3.0	50.2	4.8
Average			**5.8**	**1.1**	**36.7**	**3.2**	**56.6**	**3.0**
IM3 (p/i/t)	≤ 100g/L	L	14.9	3.8	48.9	4.0	57.9	1.2
Replicate 2			16.8	2.0	51.4	1.6	68.9	1.4
Replicate 3			15.8	2.0	50.3	2.6	53.4	1.0
Average			**15.8**	**2.6**	**50.2**	**2.7**	**60.1**	**1.2**
IM4 (p/i/t)	≤ 100g/L	L	3.7	0.2	33.5	2.6	67.1	0.6
Replicate 2			4.8	0.2	40.1	1.8	75.9	3.2
Replicate 3			4.5	0.2	36.9	1.2	58.8	0.6
Average			**4.3**	**0.2**	**36.8**	**1.9**	**67.3**	**1.5**

Prohesion - Color

APPENDIX D

Excerpts from CARB & SCAQMD Reactivity Study

Reactivity & Availability

SCAQMD Reactivity Study[1]

The following sections have been extracted from the above-referenced report, with some additional summarized results from Dr. William Carter's Presentation pertaining to the reactivity project sponsored by CARB:

As a part of the 1999 amendments to Rule 1113 – Architectural Coatings, the California South Coast Air Quality Management District (SCAQMD) Board approved a resolution, directing the SCAQMD staff to assess the reactivity and availability of solvents typically used in the formulation of architectural coatings. As a part of that effort, staff also included an assessment to further understand the interactions between various architectural coating emissions and mobile emission sources on particulate matter (PM) formation.

As an active member of the Reactivity Research Working Group (RRWG), a public-private partnership with a charter to conduct research on reactivity-based controls to determine whether it is feasible as an alternative compliance option, staff has coordinated their current efforts with CARB and RRWG. The RRWG's efforts to date have found that different VOC species have varying reactive properties to form ozone under the same NO_x environment. However, RRWG's efforts have also highlighted the need for additional work needed to reduce the uncertainty associated with the reactivity values determined using an environmental chamber, especially for the most commonly used solvents in architectural coatings formulations, and their impacts relative to impacts of mobile source emissions. The overall goal is to assess the feasibility of this optional strategy that could potentially allow manufacturers to use greater quantities of less reactive solvents, and reduce the quantity of higher reactive solvents to achieve the same level of ozone reductions, as those achieved through mass reduction. The environmental chambers previously used to develop the existing models had a number of limitations, particularly for evaluating effects on some VOC species. Because of this, in 1998, the U.S. EPA provided $3 million funding to the College of Engineering Center for Environmental Research and Technology (CE-CERT) at the University of California at Riverside (UCR) for the design, construction and operation of a state-of-the-art, next-generation environmental chamber facility capable of obtaining the data needed for assessing the use of reactivity data as an alternative ozone control strategy to the established mass reduction method(Carter et al, 1999; Carter, 2002a). This chamber was completed in 2003 and successfully employed to evaluate mechanisms for photochemical O_3 formation under low NO_x conditions (Carter 2004) and for other projects, discussed below.

[1] Reactivity and Availability Studies of VOC Species Found in Architectural Coatings & Mobile Sources, Dr. William P. L. Carter, July 2005

The California Air Resources Board (CARB), along with the SCAQMD, contracted CE-CERT to utilize the new chamber to improve reactivity assessments of some solvent species, with each group funding the evaluation of certain VOC species most commonly used in architectural coatings. Due to limited funding available to both agencies, CARB funded a subset of VOCs most commonly used in solvent-based coating formulations as well as Texanol®, whereas the SCAQMD funding was used exclusively for the most common VOC species used in waterborne formulations.

The CARB project involved conducting ozone reactivity experiments on seven different types of coatings VOCs, which were to be determined in consultation with the CARB staff and the CARB's Reactivity Research Advisory Committee (RRAC). As is the case with the RRWG, the RRAC consists of representatives of industry and regulatory groups, including the SCAQMD. The compounds chosen for study for that project included Texanol®[2], an important compound in water-based coatings, and six different types of petroleum distillates that are utilized in solvent-based and (to a lesser extent) water-based coatings. A report on the CARB study was completed earlier in 2005 (Carter and Malkina, 2005). The results of the study yielded useful information concerning the atmospheric ozone impacts of these compounds and the ability of the current SAPRC-99 detailed chemical mechanism (Carter, 2000a) to accurately simulate these impacts (Carter and Malkina, 2005).

In addition to the verifying the reactivity data for solvents found in waterborne coatings, the SCAQMD study also evaluated the issue of availability of low volatility or highly hydrophilic solvents to react in the gas phase and promote ozone formation, is another area of potential concern when assessing ozone impacts of VOCs. If these compounds tend to be absorbed to any significant extent on surfaces or PM before they have a chance to react in the gas phase, then their actual impact on ozone formation would be less than predicted using gas-phase mechanisms in current models. In 1999, the RRWG identified the need for this type of assessment but to date has funded research focusing on modeling only. The SCAQMD study is the first actual environmental chamber experiments for assessing availability of the VOC species and evaluating model predictions of availability. Furthermore, the SCAQMD study included an objective to assess the PM formation potential of all the solvents studied for the CARB and SCAQMD projects. The specific objectives and work carried out for this project are described below.

- Conduct environmental chamber experiments for reactivity assessment and chemical mechanism evaluation for several types of coatings or solvent VOCs selected by the SCAQMD in conjunction with discussions with the CE-CERT investigators and RRAC. The compounds chosen for study were propylene and ethylene glycols, diethylene glycol n-butyl ether (2-(2-Butoxyethoxy)-ethanol, or dipropylene glycol butyl ether, DGBE), and benzyl alcohol. The two glycols were considered not to have uncertain mechanisms but were studied because of their

[2] Texanol is a registered trademark of Eastman Chemical Company. It is used throughout this report rather than the generic chemical name for simplicity.

extreme importance in the emissions inventories. DGBE was studied because it is also important in the water-based coatings inventory and has not been experimentally studied previously. Benzyl alcohol was studied because it is also emitted to some extent and had extremely high chemical mechanism uncertainty.

- Conduct measurements of PM formation in reactivity assessment and mechanism evaluation experiments not only for this project but also for the experiments carried out for the CARB coatings reactivity project. The data obtained can then be used to evaluate, at least in a qualitative sense, the PM formation potentials of the types of VOCs studied, and be available for potentially developing and evaluating models for their impacts on PM formation in the atmosphere.
- Carry out a limited number of experiments to characterize background effects related to PM formation that can be used when interpreting or modeling the PM formation in the chamber experiments discussed above, and that can serve as a basis for designing future PM studies in this chamber.
- Evaluate the potential utility of the environmental chamber for testing models for availability of emitted VOCs to react in the atmosphere to form O_3 and secondary PM. After discussion with members of the atmospheric availability subgroup of the RRWG it was decided to focus on conducting several experiments to assess the effects of humidity and seed aerosol on availability, decay rates and reactivities of ethylene and propylene glycol.

The following table summarizes the results of ARB's reactivity study, as documented in the report "Evaluation of Atmospheric Impacts of Selected Coatings VOC Emissions", prepared by W.P.L. Carter and I. Malkina, dated March 21, 2005.

Table E 1. Summary of solvents studied in the environmental chamber experiments and the overall conclusions from the evaluation results.

Compound or Mixture	MIR [a] Previous	MIR [a] Revised	PM Impact or Approximate SOA Yields [b]	Discussion of Mechanism Evaluation Results [c]
		Water Based Coatings VOCs		
Ethylene Glycol	3.36	3.63	Lower PM than base case	The glycolaldehyde product now represented explicitly. This mechanism still underpredicts glycol reactivity by 25-30% in experiments with aromatics in the base ROG surrogate, but there is no chemical justification for glycol mechanism adjustments
Propylene Glycol	2.74	No change	Lower PM than base case	This mechanism underpredicts glycol reactivity by ~20% in experiments with aromatics in the base ROG surrogate, but there is no chemical justification for glycol mechanism adjustments
Texanol® (Isobutyrate monoesters of 2,2,4-tri-methyl-1,3-pentanediol) [d]	0.88	No change	No net effect on PM formed evident	Experimental results for Texanol® and DGBE generally consistent with chamber data. The OH radical rate constants found to be in good agreement with the estimated values used in the mechanism.
2-(2-butoxyethoxy)-ethanol (DGBE)	2.86	No change	14 - 26%	
Benzyl Alcohol	None	4.89	~30%	Mechanism developed for this project and adjusted to fit the chamber data. Mechanism performance comparable to that for other aromatic compounds.
		Hydrocarbon Solvents Studied for CARB Project [e]		
VMP Naphtha, Primarily C_7-C_9 mixed alkanes	1.41	1.35	0.1 - 0.7%	The experimental results for the primarily alkane, petroleum distillate-derived hydrocarbon solvents were generally consistent with the chamber data.
Dearomatized Mixed Alkanes, Primarily C_{10}-C_{12} (ASTM-1C)	0.91	0.96	~0.2%	
Reduced Aromatics Mineral Spirits, Primarily C_{10}-C_{12} mixed alkanes with 6% aromatics (ASTM-1B)	1.21	1.26	0.6 - 0.7%	

Compound or Mixture	MIR [a]		PM Impact or Approximate SOA Yields [b]	Discussion of Mechanism Evaluation Results [c]
	Previous	Revised		
Regular mineral spirits, Primarily C_{10}-C_{12} mixed alkanes with 19% aromatics (ASTM-1A)	1.82	1.97	0.3 - 0.8%	The experimental results were generally consistent with the chamber data.
Synthetic isoparaffinic alkanes, primarily C_{10}-C_{12} branched alkanes (ASTM-3C1)	0.81	1.1 - 1.5 [f]	No net effect on PM formed evident	Data not well simulated by the model. Model probably underpredicts atmospheric ozone formation by 25-75%, depending on the cause of the discrepancy.
Aromatic 100 (Primarily C_9-C_{10} alkylbenzenes)	7.51	7.70	0.3 - 0.4%	Experimental results representing MIR conditions generally consistent with model predictions. But model underpredicted O_3 inhibition in low NO_x conditions and has other problems.

[a] Maximum incremental reactivity in gm O_3 per gm VOC. Calculated as described by Carter (1994a,b). Values in "Previous" column are the MIR values incorporated in CARB regulations. The values for the compounds were from the most recent complete MIR tabulation given by Carter (1003). The values for the hydrocarbon solvents were derived using the CARB Bin assignments developed by Kwok et al (2000). No mechanism or MIR value previously existed for benzyl alcohol. Values in the "Revised" column are the best estimate MIRs based on the results of the current study. The changes in MIRs that may result when the mechanism is updated are unknown.

[b] For compounds with measurable positive PM impacts, the secondary organic aerosol (SOA) yields were derived from differences between PM volume levels in the base case and added test compound incremental reactivity experiments after 5 hours of irradiation. These approximate yields were estimated based on assuming same molecular weight for SOA as the starting material, assuming that the PM formed has the same density as water, and using approximate corrections for PM wall losses and approximate estimates of amounts of test compound or hydrocarbon solvent constituents reacted.

[c] Ozone prediction evaluation results are applicable to the SAPRC-99 mechanism (Carter, 2000a).

[d] Texanol was studied for the CARB project; see Carter and Malkina (2005) for details. Texanol is a registered trademark of Eastman Chemical Company.

[e] See Carter and Malkina (2005) for a discussion of the experimental and calculated data for the hydrocarbon solvent reactivities. The ASTM designations are based on the D 235-02 specification (ASTM, 2003).

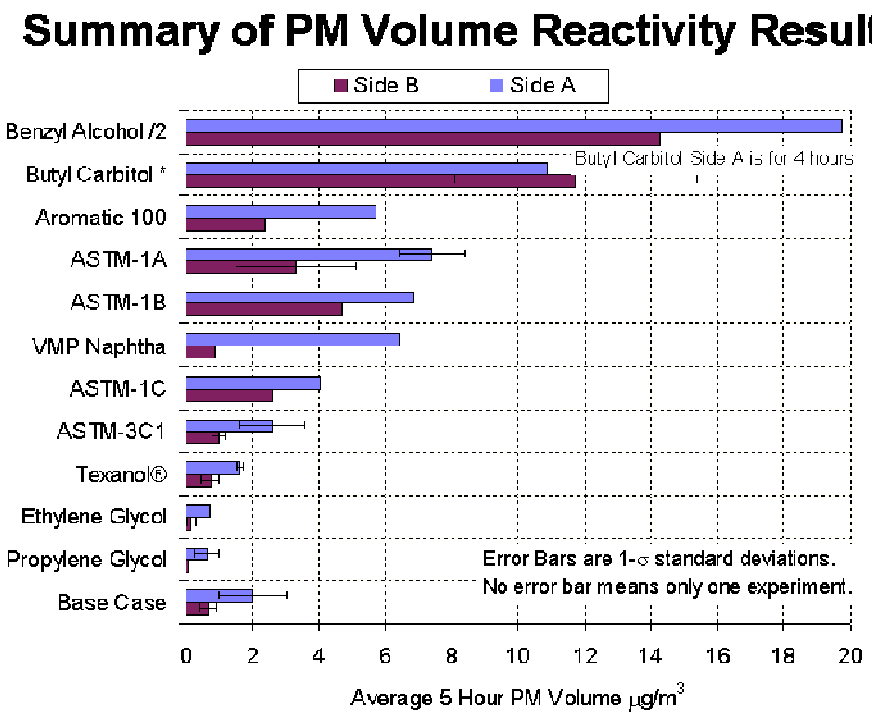
[f] Range of MIRs for alternative mechanisms adjusted to fit the chamber data with this solvent. The available data are inadequate to distinguish between these mechanisms. See Carter and Malkina (2005).

- Chamber data for Texanol®, butyl carbitol, and primarily alkane petroleum distillates are consistent with SAPRC-99 predictions.
- Chamber data for Aromatics-100 consistent with SAPRC-99 for MIR conditions, but O3 inhibition at low NOx underpredicted.

- Reactivities of at least some synthetic hydrocarbon mixtures may be underpredicted by up to a factor of 2 under some experiments.[3]
- Glycol reactivities underpredicted by ~30% in some experiments, but unclear whether adjustments are appropriate.
- New mechanism developed for benzyl alcohol that simulates chamber data about as well as mechanisms for other aromatics

The following chart summarizes the potential PM formation for each of the VOC species tested in the environmental chamber:

Relative secondary PM impacts: benzyl alcohol >> butyl carbitol > petroleum distillates. No measurable PM impacts for others. However, this is a preliminary qualitative analysis to assess the potential use of the environmental chamber for future quantitative studies of PM, and the contribution of VOCs in PM formation.



[3] Personal communication between Naveen Berry & Dr. William Carter to discuss difference in conclusions from a presentation and the final CARB report, September 2005

The following chart summarizes the availability studies:

Glycol Availability Experiments: Preliminary Conclusions

- No clear effect on glycol consumption rate or ozone reactivity for humidity up to 35% and $(NH_4)_2SO_4$ or NH_4HSO_4 seed aerosol up to 10 $\mu g/m^3$.
- But there still may be a measurable effect at higher humidity or aerosol concentration, with a different type of aerosol
- Upgrades are being made to the chamber facility to facilitate experiments at higher RH, aerosol levels.
- But experiments that measure increases in aerosol mass when exposed to gas-phase VOCs may give a more sensitive measure of VOC uptake on aerosols

The conclusion reached by the study indicates that there was no evidence that humidity and aerosol affects glycol availability at the relatively low aerosol loadings and humidities examined.

The following recommendations/concerns are summarized by the SCAQMD staff pertaining to reactivity, availability, and PM assessment:

- Aromatics mechanisms need to be improved to further reduce uncertainties in reactivity assessments (e.g., glycols)
- Extrapolation of current mechanisms to higher aromatics, such as Aromatics 200, still highly uncertain
- Attempts should be made to improve the direct reactivity measurement method and improve its characterization and variability. The direct reactivity measurement method should be applied to hydrocarbon solvents of interest, including synthetic branched alkane mixtures where there appear to be problems with the current mechanism
- A modified base case experiment that gives better correlations between chamber and atmospheric reactivity would be useful
- The results do not indicate a compelling need to change the hydrocarbon bin assignments for the regulations already in place, but revisions will be needed when the regulatory reactivity scale is updated

- Well-characterized environmental chamber data needed to develop predictive secondary PM models. Work needed on background PM characterization in chambers

2001 Architectural Coatings Survey -Final Reactivity Analysis[4]

The following sections (italicized) have been extracted from the above-referenced report:

In July 2001, the Air Resources Board (ARB or Board) conducted a survey of companies that sold architectural coating products in California in 2000. This report contains a detailed analysis of the photochemical reactivity associated with architectural coatings, based on results from that survey. This document is intended to provide different options for evaluating the reactivity of architectural coatings, but it is not a formal regulatory document. ARB's 2001 Architectural Coating Survey gathered detailed sales information and speciation of VOCs in product formulations, with ingredients reported to the 0.1 weight percent level. When coatings are applied, they release different types of organic compounds that can react in the atmosphere to produce different amounts of ozone. This ozone forming potential is called hydrocarbon reactivity and it is determined by the photochemical reactions in the atmosphere. If a coating contains a small amount of a highly reactive compound, it could have a relatively high reactivity rating even if it has a low level of volatile organic compounds (VOCs). Similarly, a coating that has a high VOC content may have a relatively low reactivity rating, if it contains compounds that aren't very reactive.

The Product-Weighted MIR (PWMIR) represents a compilation of MIR values for all of the individual ingredients in a coating. In one approach, which was used in the ARB's aerosol coatings regulation, the product-weighted MIRs for coatings are calculated as follows:

$$[\text{PWMIR, g } O_3/\text{g product}] = [Wt\%]_1*[MIR]_1 + [Wt\%]_2*[MIR]_2 + \ldots + [Wt\%]_n*[MIR]_n$$

where

$[Wt\%]_i$ *= the weight percent of each ingredient in a coating product (e.g., 0.25 for 25%)*

$[MIR]_i$ *= the MIR value of each ingredient in a coating product, g* O_3*/g TOG*

n = the total number of ingredients in a coating product

[4] 2001 Architectural Coatings Survey - Final Reactivity Analysis, California Air Resources Board, March 2005

Sales-Weighted Average MIR Values

To determine sales-weighted average MIR values (SWAMIRs), we used the following equation:

$$SWAMIR = \frac{[Sales]1*[PWMIR]1 + [Sales]2*[PWMIR]2 + \ldots + [Sales]n*[PWMIR]n}{[Sales]1 + [Sales]2 + \ldots + [Sales]n}$$

where

[Sales, gals]i = the sales of product "i", gallons
[PWMIR]i = the Product-Weighted MIR value, grams ozone/gram product
n = the total number of coating products

SWAMIRs were calculated for all of the coating categories based on the 2001 survey data. The survey collected sales data for more than 8,000 products and it also gathered data on the chemical ingredients contained in each product. However, there were approximately 100 products for which no ingredient data were submitted. These 100 products only represent 2.0 percent of the total sales volume. Since ingredient data are required to identify MIRs, we did not include the products with missing ingredient data when calculating sales-weighted average MIR values..

The table on the next few pages contains SWAMIRs that were calculated for 50-g/l ranges for all categories. Sales-weighted averages were calculated based on sales volumes (gallons).

As can be gleaned from the data, the SWAMIRs generally decrease as the VOC content (mass of VOC) decreases, based on the 50 g/l increments in data. This is just one of the methods of assessing the potential of reactivity as an alternative approach. However, some members of the architectural coatings industry have indicated that the PWMIR and SWAMIR approach is appropriate for regulating aerosol coatings, but they do not believe this approach is suitable for architectural coatings.

CARB staff has proposed alternative approaches to calculating reactivity data, but the RRAC has not reached a consensus.

The complete report can be downloaded from the following URL:

http://www.arb.ca.gov/coatings/arch/reactivity/final_reactivity_analysis_rpt.pdf

Conclusion

The following represent AQMD staff conclusions on the current status of using reactivity as an alternative ozone control strategy, as well as outline the next steps for CARB and AQMD staff:

CARB and AQMD will continue to assess the reports recently completed by CE-CERT and will work with industry in resolving remaining concerns with the results. In the meantime, CARB staff has initiated another architectural coating survey to collect sales and ingredient data for calendar year 2004. This survey would reflect the coatings being sold in California after all of the SCM VOC limits have taken effect. It is expected that results from this survey would be finalized during 2006. Data from that survey will be analyzed similarly to how the 2001 survey data were analyzed in this report. After the 2005 Architectural Coating Survey data are analyzed, CARB staff will begin the process to revise the 2000 SCM to incorporate lower mass-based VOC limits, or new reactivity-based limits, or some combination of both. This process is anticipated to occur in the 2006-2007 timeframe.

SCAQMD staff will continue to monitor all reactivity-related research at the RRWG, and plans to work closely with CARB staff on the survey and subsequent SCM, as well as with USEPA staff on the Interim Guidance on Control of Volatile Organic Compounds in Ozone State Implementation Plans to assess reactivity. However, based on the latest research and analysis, as well as the recommendations of the researcher to conduct additional analysis, staff supports the continuation of a mass-based ozone control strategy, with future consideration for a reactivity-based approach.

Sales-Weighted Average MIR Values in 50-g/l Ranges (grams ozone/gram product)

Coating Category	VOC Regulatory Ranges (grams/liter)														
	0-50	**51-100**	**101-150**	**151-200**	**201-250**	**251-300**	**301-350**	**351-400**	**401-450**	**451-500**	**501-550**	**551-600**	**601-650**	**651-700**	**> 700**
Antenna						0.36		1.37		0.73					
Bituminous Roof	0.00	0.07	0.14	0.28	0.38	0.50	0.52	0.94		0.43					
Bituminous Roof Primer	0.06			0.20			0.84		0.60						
Bond Breakers		0.08		0.06		0.08	0.19					0.82			
Clear Brushing Lacquer														1.51	
Concrete Curing Compounds	0.06	0.07	0.11	0.21	0.10	0.17	1.12			0.01	0.49	1.35	3.68	5.39	1.66
Dry Fog	0.02	0.04	0.08	0.07		0.25	0.30	0.37	0.40		0.82				
Faux Finishing		0.06	0.10		0.20	0.24	0.23	0.31	0.51					0.78	0.95
Fire Resistive	0.04														
Fire Retardant – Clear	0.00														
Fire Retardant – Opaque	0.02	0.04	0.08		1.09	1.04	0.89			0.98		3.91			4.82
Flat	0.04	0.05	0.09	0.13	0.14			0.43	0.25	0.41				0.22	
Floor	0.17	0.06	0.24	0.16	0.25	0.27	0.27	0.64	0.89	0.50	1.05		1.09		
Flow									0.54						
Form Release Compounds		0.07	0.05	0.40	0.31		0.74		0.94						
Graphic Arts		0.03	0.10	0.22	0.28	0.32	0.30	0.86	0.64		0.50				
High Temperature						0.58	0.52	0.78	0.58	1.23	2.54	2.94	1.85	2.88	
Industrial Maintenance	0.04	0.07	0.25	0.33	0.75	0.70	1.20	0.63	0.96	1.45	0.89	2.01	2.49	1.26	3.09
Lacquers	0.01	0.09	0.18	0.22	0.27	0.28	0.36			0.67	0.90	1.00	1.66	1.80	1.90
Low Solids	0.05	0.23													
Magnesite Cement									2.12						
Mastic Texture	0.01	0.08	0.19	0.17	0.12	0.37		0.31							
Metallic Pigmented		0.25	0.08	0.22	0.35	0.84	0.62	0.92	0.82	1.96	1.15	1.74	2.54	4.49	4.59
Multi-Color		0.02	0.10		0.18					0.24	0.43				2.02

Table 2-3: ***Sales-Weighted Average MIR Values in 50-g/l Ranges (grams ozone/gram product)***

Coating Category	VOC Regulatory Ranges (grams/liter)														
	0-50	**51-100**	**101-150**	**151-200**	**201-250**	**251-300**	**301-350**	**351-400**	**401-450**	**451-500**	**501-550**	**551-600**	**601-650**	**651-700**	**> 700**
Nonflat - High Gloss	0.01	0.06	0.11	0.32	0.26	0.30	0.63	0.64	0.60	0.62	0.92		4.68		
Nonflat - Low Gloss	0.02	0.06	0.10	0.13	0.19	0.20	0.50	0.44	0.79	0.54			4.68		
Nonflat - Medium Gloss	0.00	0.06	0.10	0.13	0.19	0.19	0.34	0.68	1.00	0.45	0.58		4.68	2.49	
Other	0.00	0.18	0.02		0.95	0.42	0.37				0.60	1.68		0.78	
Pre-Treatment Wash Primer [1]	0.07	0.07	0.07				0.29	0.29						1.03	1.83
Primer, Sealer, and Undercoater	0.08	0.06	0.10	0.12	0.19	0.21	0.54	0.62	0.62	0.80	0.75	3.29	1.99	3.82	1.89
Quick Dry Enamel				0.20	0.27		0.44	0.58	0.49	1.17	3.04				
Quick Dry Primer, Sealer, and Undercoater	0.00	0.05	0.14	0.02	0.79	0.40	1.29	0.45	0.49	0.71	0.83	1.37	1.15	3.14	3.80
Recycled					0.03	0.03									
Roof	0.03	0.08	0.18	0.15	0.29	0.64	0.72		1.17						1.79
Rust Preventative		0.04	0.11	0.14	0.22	1.25	1.36	0.41	0.64	0.42					1.34
Sanding Sealers				0.14	0.18	0.20	0.17				0.93	1.80		1.04	2.43
Shellacs – Clear												0.90	1.21	1.12	
Shellacs – Opaque											0.74				
Specialty Primer, Sealer, and Undercoater	0.03	0.11	0.09	0.15	0.23	0.60	0.35		0.58	0.87				1.61	
Stains - Clear/Semitransparent	0.00	0.05	0.07	0.15	0.22	0.16	0.51	1.05	0.49	0.76	0.82	0.93	1.38	1.90	1.63
Stains – Opaque	0.01	0.08	0.09	0.14	0.15	0.20	0.49	0.33	0.43	0.55	0.76	3.30	1.08		3.21
Swimming Pool	0.04	0.08	0.08	0.20	0.45	1.09	1.13		1.19		0.48				
Swimming Pool Repair and Maintenance												3.56			
Traffic Marking	0.00	0.03	0.10	0.10	0.24	0.39	0.42	0.58	0.45						1.54
Varnishes - Clear		0.09	0.16	0.14	0.21	0.31	0.68	0.62	0.69	0.73	0.73	1.16		1.55	1.75
Varnishes - Semitransparent					0.22	0.23	0.18	0.29	0.52	1.11	1.94				
Waterproofing Concrete/Masonry Sealers	0.00	0.08	0.10	0.19	0.85	0.21	0.26	0.75	0.74		0.79	3.99		1.81	1.65

Table 2-3: ***Sales-Weighted Average MIR Values in 50-g/l Ranges (grams ozone/gram product)***

Coating Category	VOC Regulatory Ranges (grams/liter)														
	0-50	**51-100**	**101-150**	**151-200**	**201-250**	**251-300**	**301-350**	**351-400**	**401-450**	**451-500**	**501-550**	**551-600**	**601-650**	**651-700**	**> 700**
Waterproofing Sealers	0.00	0.07	0.10	0.36	0.47	0.60	0.35	0.43	0.65	0.01	0.83	1.13	0.85	1.73	1.54
Wood Preservatives	0.06	0.30	0.10	0.11	0.31	0.26	0.68		0.48	0.72	1.22			1.13	1.67

Blank cells indicate that the SWAMIR could not be calculated for this VOC Regulatory range, because there were no sales or the Form 3 ingredient data was incomplete.

1. These results are questionable because a portion of the sales consists of products that manufacturers chose to categorize as Pretreatment
   Wash Primers, but could potentially qualify as Specialty PSUs.

APPENDIX E

Comment Letters Received and Response to Comments

Comments being sought.