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

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
<table>
<thead>
<tr>
<th>Name</th>
<th>Company/Institution</th>
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<tr>
<td>Kevin R. Merlo</td>
<td>Air Products Polymers</td>
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<tr>
<td>Christine Stanley</td>
<td>Ameron Protective Coatings Systems</td>
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<td>John Woods</td>
<td>Ameron Protective Coatings Systems</td>
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<tr>
<td>Norm Mowrer</td>
<td>Ameron Protective Coatings Systems</td>
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<tr>
<td>Brian Turk</td>
<td>BASF</td>
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<td>Kathy Allen</td>
<td>Bayer Material Science</td>
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<td>Michael Butler</td>
<td>BEHR Process Corporation</td>
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<td>Parker Pace</td>
<td>BEHR Process Corporation</td>
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<tr>
<td>Kip Cleverly</td>
<td>Benjamin Moore Paints</td>
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<td>Barry Jenkin</td>
<td>Benjamin Moore Paints</td>
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<td>Ron Widner</td>
<td>Benjamin Moore Paints</td>
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<tr>
<td>Gerald Thompson</td>
<td>BonaKemi USA, Inc.</td>
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<tr>
<td>Dane Jones, Ph.D.</td>
<td>Cal Poly, SLO</td>
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<tr>
<td>Max Wills, Ph.D.</td>
<td>Cal Poly, SLO</td>
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<tr>
<td>Andy Rogerson</td>
<td>Caltrans</td>
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<td>Monique Davis</td>
<td>CARB</td>
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<td>Jim Nyarady</td>
<td>CARB</td>
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<td>Barry Barman</td>
<td>CSI Services, Inc.</td>
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<td>Bud Jenkins</td>
<td>CSU Pomona</td>
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<td>Charles Milner Ph.D.</td>
<td>CSU Pomona</td>
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<td>Dennis St. Laurent</td>
<td>CYTEC</td>
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<td>Lloyd Haanstra</td>
<td>Deft Coatings</td>
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<td>Randall J. Brady</td>
<td>Deft Coatings</td>
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<tr>
<td>Marc N. Hiraoka</td>
<td>Disneyland Resort</td>
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<tr>
<td>Michael Van Leeuwen</td>
<td>Disneyland Resort</td>
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<tr>
<td>Michael G. Rose</td>
<td>Dunn-Edwards Paints</td>
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<td>Robert Wendell</td>
<td>Dunn-Edwards Paints</td>
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<tr>
<td>Kevin McCreight</td>
<td>Eastman Chemical Company</td>
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<td>Ronald J. Regan</td>
<td>Eastman Chemical Company</td>
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<td>Joseph Tashjian</td>
<td>Ellis Paint Company</td>
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<td>Howard Berman</td>
<td>Environmental Mediation, Inc.</td>
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<td>Robert Henderson</td>
<td>EPMAR</td>
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<td>Dave/Adam Fuhr</td>
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<td>Richard Hart</td>
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<td>Jim Kantola</td>
<td>ICI Dulux Sinclair</td>
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<td>Jeffrey P. Mulford</td>
<td>Lifeguard</td>
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<td>David Sibbrel</td>
<td>Life Paint Company</td>
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<tr>
<td>Daniel B. Pourreau, Ph.D</td>
<td>Lyondell</td>
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<td>Bob Coleman</td>
<td>Merecole, Inc.</td>
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<td>Raymond Russell</td>
<td>Morwear Paint Co.</td>
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<tr>
<td>Stephen Murphy</td>
<td>Murphy Industrial Coatings</td>
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<tr>
<td>Carol Yip Kaufman</td>
<td>MWD</td>
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<tr>
<td>John Wallace</td>
<td>MWD</td>
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<tr>
<td>David Darling</td>
<td>National Paint &amp; Coatings Association</td>
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<td>Bob Nelson</td>
<td>National Paint &amp; Coatings Association</td>
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<tr>
<td>Michelle Richards</td>
<td>NBC Universal</td>
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<td>Tony Olson</td>
<td>NBC Universal</td>
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<td>Dinkar Naik</td>
<td>Pacific Polymers</td>
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<tr>
<td>Robert Gross</td>
<td>PPG Industries, Inc.</td>
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<td>Claude Florent</td>
<td>Rainguard</td>
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<td>Aqua Mix</td>
<td>Real Bourdage</td>
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<tr>
<td>Brough Richey, Ph.D.</td>
<td>Rohm and Hass Company</td>
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<tr>
<td>Clare Doyle</td>
<td>Rohm and Hass Company</td>
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<tr>
<td>William H. Hill</td>
<td>Rohm and Hass Company</td>
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<tr>
<td>Ben McCall</td>
<td>SDA Craft Technologies</td>
</tr>
<tr>
<td>Jason Jones</td>
<td>Sherwin-Williams Company</td>
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<tr>
<td>Madelyn Harding</td>
<td>Sherwin-Williams Company</td>
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<tr>
<td>Albert G. Silverton</td>
<td>Silvertown Products, inc.</td>
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<tr>
<td>Darin A. Shields</td>
<td>Specialty Polymers, Inc.</td>
</tr>
<tr>
<td>Kevin Worrall</td>
<td>Texture Coatings of America, Inc.</td>
</tr>
<tr>
<td>Tony Hobbs</td>
<td>Tnemec Corporation</td>
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<tr>
<td>Kathryn Sheppard</td>
<td>UMR Coatings Institute</td>
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<tr>
<td>Michael R. Van De Mark, Ph.D.</td>
<td>UMR Coatings Institute</td>
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<tr>
<td>Don Sudduth</td>
<td>UV Chemistry Company, Inc.</td>
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<td>Duncan Gamble</td>
<td>UV Chemistry Company, Inc.</td>
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<tr>
<td>Hamid Pourshirazi</td>
<td>Vista Paint</td>
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<tr>
<td>Jerome Fischer</td>
<td>Vista Paint</td>
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<td>John Long</td>
<td>Vista Paint</td>
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ATTACHMENT B

ANNUAL STATUS REPORT ON RULE 1113 – ARCHITECTURAL COATINGS
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

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Speaker of the Assembly Appointee

Vice Chair: S. ROY WILSON, Ed.D.
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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.
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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

<table>
<thead>
<tr>
<th></th>
<th>Waterborne</th>
<th>Solvent-Based</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Volume (%)</td>
<td>83</td>
<td>17</td>
</tr>
<tr>
<td>Total Emissions (%)</td>
<td>41</td>
<td>59</td>
</tr>
<tr>
<td>Annual Volume (Gal/Yr)</td>
<td>81,548,961</td>
<td>16,906,211</td>
</tr>
</tbody>
</table>

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

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

*- 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

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

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.

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.
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

<table>
<thead>
<tr>
<th>Coating Category</th>
<th>Number of Coating Types</th>
<th>No. of Products</th>
<th>Exterior(E), Interior(I), Dual(D), Undetermined(U)</th>
<th>Substrates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear Wood Finishes</td>
<td>39</td>
<td>77</td>
<td>6-E, 55-I, 16-D</td>
<td>Wood surfaces for residential &amp; 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.</td>
</tr>
<tr>
<td>Clear Wood Finishes, Sanding Sealer</td>
<td>15</td>
<td>20</td>
<td>14-I, 6-D</td>
<td>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.</td>
</tr>
<tr>
<td>Pigmented Lacquers</td>
<td>7</td>
<td>10</td>
<td>2-E, 6-I, 2-D</td>
<td>Substrates include steel, aluminum siding, concrete/block, masonry, wood, masonry, prepared vinyl, stucco, brick, pumice, and primed metal surfaces.</td>
</tr>
<tr>
<td>Floor</td>
<td>15</td>
<td>20</td>
<td>3-E, 9-I, 8-D</td>
<td>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.</td>
</tr>
<tr>
<td>Coating Category</td>
<td>Number of Coating Types</td>
<td>No. of Products</td>
<td>Exterior(E), Interior(I), Dual(D), Undetermined(U)</td>
<td>Substrates</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------------</td>
<td>----------------</td>
<td>--------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Industrial Maintenance</td>
<td>49</td>
<td>288</td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>Non-flat, High Gloss</td>
<td>4</td>
<td>5</td>
<td>1-E 4-D</td>
<td>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.</td>
</tr>
<tr>
<td>Non-flat, Medium Gloss</td>
<td>25</td>
<td>40</td>
<td>2-E 35-I 3-D</td>
<td>Ideal for walls, ceilings, wallboard, properly cured and primed plaster, sheetrock, masonry and primed metal.</td>
</tr>
<tr>
<td>Non-flat, Low Gloss</td>
<td>25</td>
<td>36</td>
<td>2-E 27-I 7-D</td>
<td>For ceilings, walls, and properly prepared galvanized and structural steel surfaces in industrial, commercial and institutional buildings and warehouses.</td>
</tr>
<tr>
<td>Primer, Sealer, Undercoater</td>
<td>45</td>
<td>110</td>
<td>15-E 51-I 44-D</td>
<td>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.</td>
</tr>
<tr>
<td>Quick Dry Primer, Sealer, Undercoater</td>
<td>17</td>
<td>33</td>
<td>3-E 6-I 24-D</td>
<td>For steel, galvanized metal, wood, aluminum, masonry surfaces, piping, and handrails.</td>
</tr>
<tr>
<td>Rust Preventative</td>
<td>23</td>
<td>28</td>
<td>5-E 2-I 19-D 2-U</td>
<td>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.</td>
</tr>
</tbody>
</table>
### Table 4 Cont’d
Web Based Search For Available Future Compliant Coatings

<table>
<thead>
<tr>
<th>Coating Category</th>
<th>Number of Coating Types</th>
<th>No. of Products</th>
<th>Exterior(E), Interior(I), Dual(D), Undetermined(U)</th>
<th>Substrates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stains, Exterior</td>
<td>21</td>
<td>30</td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>Water Proofing Sealers</td>
<td>17</td>
<td>23</td>
<td></td>
<td>For concrete, masonry, stucco, most wood &amp; metal substrates, new or previously painted vertical surfaces, vertical masonry substrates such as stone, tilt-up concrete, brick, clay tile, stucco and block.</td>
</tr>
<tr>
<td>Water Proofing Concrete/Masonry Sealers</td>
<td>26</td>
<td>50</td>
<td></td>
<td>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.</td>
</tr>
</tbody>
</table>

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

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

SCAP's 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 MWD's 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. MWD's 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 MWD's 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 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*

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Type of Coatings</th>
<th>Interior</th>
<th>Exterior</th>
<th>Phone Number</th>
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<tr>
<td>Alistagen Corporation</td>
<td>PSU, F</td>
<td>YES</td>
<td>NO</td>
<td>866-280-0001 305-936-8691</td>
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<td>American Formulators Mfg</td>
<td>F, NFE, NFSG</td>
<td>YES</td>
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<td>Anchor Paint</td>
<td>WPC/MS</td>
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<tr>
<td>Benjamin Moore &amp; Co</td>
<td>PSU, F, NFS, NFE, NFSG</td>
<td>YES</td>
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<tr>
<td>Cloverdale Paint Inc</td>
<td>PSU, NF, IM</td>
<td>YES</td>
<td>YES</td>
<td>604 596 6261</td>
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<tr>
<td>Coronado Paint Co</td>
<td>F, NF, PSU</td>
<td>YES</td>
<td>NO</td>
<td>386-428-6461 x115</td>
</tr>
<tr>
<td>Degussa Building Systems</td>
<td>PSU, WPS, WPCMS</td>
<td>YES</td>
<td>YES</td>
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<tr>
<td>Diamond Vogel</td>
<td>F, NF, P</td>
<td>YES</td>
<td>NO</td>
<td>800-728-6435</td>
</tr>
<tr>
<td>Dunn Edwards</td>
<td>F, NF</td>
<td>YES</td>
<td>NO</td>
<td>888-337-2468</td>
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<td>E-3 Coatings, Inc</td>
<td>S</td>
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<td>530-308-2189</td>
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<tr>
<td>Frazee Industries</td>
<td>PSU, F, NFS, NFE, NFSG</td>
<td>YES</td>
<td>NO</td>
<td>858-626-3490</td>
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<tr>
<td>Fuhr International, LLC</td>
<td>PSU, F, NF</td>
<td>YES</td>
<td>YES</td>
<td>800-558-7437 816-809-4403</td>
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<tr>
<td>ICI Paints</td>
<td>PSU, F, NFS, NFE, NFSG**</td>
<td>YES</td>
<td>YES</td>
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<tr>
<td>Kryton</td>
<td>WPS</td>
<td>YES</td>
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<tr>
<td>Miller Paint</td>
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<tr>
<td>Monopole Inc.</td>
<td>IM, WPS, WPC/MS</td>
<td>YES</td>
<td>YES</td>
<td>818-500-8585</td>
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<tr>
<td>Polibrid Coatings</td>
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<td>Richards Paints</td>
<td>F, NFS</td>
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<tr>
<td>PPG (Pittsburgh Paints)</td>
<td>PSU, F, NF</td>
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<td>YES</td>
<td>412-434-3548</td>
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<td>Pure Performance Coatings</td>
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<td></td>
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<td>Rodda Paints</td>
<td>PSU, F, NFE, NFS</td>
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<tr>
<td>Sampson Coatings, Inc</td>
<td>PSU, F, NF</td>
<td>YES</td>
<td>YES</td>
<td>804-359-5011</td>
</tr>
<tr>
<td>Samuel Cabot, Inc</td>
<td>WPS</td>
<td>NO</td>
<td>YES</td>
<td>800-877-8246</td>
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<tr>
<td>Seal-Krete Inc.</td>
<td>PSU, F</td>
<td>YES</td>
<td>YES</td>
<td>800-323-7357 x541</td>
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<tr>
<td>Sierra Performance by Rust-Oleum</td>
<td>PSU, F, NF</td>
<td>YES</td>
<td>YES</td>
<td>800-553-8444</td>
</tr>
<tr>
<td>Silvertown Products</td>
<td>S, CWF</td>
<td>NO</td>
<td>YES</td>
<td>909-986-7061</td>
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*Manufacturer names and websites may have changed over time.*
### Table 6 Cont’d
Super-compliant Architectural Coating Manufacturers*

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<th>Manufacturer</th>
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<td>Spectra-Tone Paint</td>
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<td>NO</td>
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<tr>
<td>Tried &amp; True Wood Finishes</td>
<td>CWF</td>
<td>YES</td>
<td>NO</td>
<td>607-387-9280</td>
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<td>Vista Paint</td>
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<td>YES</td>
<td>714-680-3800</td>
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<td>VOC Free</td>
<td>FLOOR SEALER, PSU, F, NF</td>
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<td>YES</td>
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<table>
<thead>
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<th>Exterior</th>
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</tr>
<tr>
<td>Duromar</td>
<td>VARIOUS SYSTEMS</td>
<td>YES</td>
<td>YES</td>
<td>781-749-6992</td>
</tr>
<tr>
<td>JFB Hart Polymers</td>
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<td>YES</td>
<td>630-574-1729</td>
</tr>
<tr>
<td>Novocoat (Formerly) Superior</td>
<td>VARIOUS SYSTEMS</td>
<td>YES</td>
<td>YES</td>
<td>972-490-0566</td>
</tr>
<tr>
<td>Environmental Products, Inc</td>
<td>VARIOUS SYSTEMS</td>
<td>YES</td>
<td>YES</td>
<td>800-888-8340</td>
</tr>
<tr>
<td>Pacific Polymer</td>
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<td>YES</td>
<td>253-983-7530</td>
</tr>
<tr>
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<tr>
<td>United Coatings</td>
<td>VARIOUS SYSTEMS</td>
<td>YES</td>
<td>YES</td>
<td>800-541-4383</td>
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*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.

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### Industrial Maintenance Coatings

<table>
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<tr>
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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

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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 Acronal products such as 110, 230 and 330 polymers that can be used for coatings at 50 g/l or less.

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.


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.


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.


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 RRGW. 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\textsubscript{3} formation under low NO\textsubscript{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 RRGW, 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>
<thead>
<tr>
<th>Year</th>
<th>No of Companies Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>12</td>
</tr>
<tr>
<td>2001</td>
<td>13</td>
</tr>
<tr>
<td>2002</td>
<td>15</td>
</tr>
<tr>
<td>2003</td>
<td>24</td>
</tr>
<tr>
<td>2004</td>
<td>29</td>
</tr>
</tbody>
</table>

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

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

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.
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.

AQMD's 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 public's 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. 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 waiting the completion of an analysis of any potential toxic risk from 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

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

* 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

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

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Published VOC</th>
<th>VOC Determination</th>
<th>VOC Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product A3-p</td>
<td>345 g/L</td>
<td>&gt;100 g/L</td>
<td>High-VOC</td>
</tr>
<tr>
<td>Product A3-t</td>
<td>390 g/L</td>
<td>&gt;100 g/L</td>
<td>High-VOC</td>
</tr>
<tr>
<td>Product B3-p</td>
<td>340 g/L</td>
<td>&gt;100 g/L</td>
<td>High-VOC</td>
</tr>
<tr>
<td>Product B3-t</td>
<td>370 g/L</td>
<td>&gt;100 g/L</td>
<td>High-VOC</td>
</tr>
<tr>
<td>Product C3-p</td>
<td>58 g/L</td>
<td>≤100 g/L</td>
<td>Low-VOC</td>
</tr>
<tr>
<td>Product C3-t</td>
<td>&lt;50 g/L</td>
<td>≤100 g/L</td>
<td>Low-VOC</td>
</tr>
<tr>
<td>Product D3-p</td>
<td>0 g/L</td>
<td>≤100 g/L</td>
<td>Low-VOC</td>
</tr>
<tr>
<td>Product D3-t</td>
<td>0 g/L</td>
<td>≤100 g/L</td>
<td>Low-VOC</td>
</tr>
</tbody>
</table>
Table 11 Cont’d
Phase III UMR Study, RP & IMC

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Published VOC</th>
<th>VOC Determination</th>
<th>VOC Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 9: Industrial Maintenance Coatings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product E3-p</td>
<td>163 g/L</td>
<td>&gt;100 g/L</td>
<td>High-VOC</td>
</tr>
<tr>
<td>Product E3-i</td>
<td>235 g/L</td>
<td>&gt;100 g/L</td>
<td>High-VOC</td>
</tr>
<tr>
<td>Product E3-t</td>
<td>&lt;250 g/L</td>
<td>&gt;100 g/L</td>
<td>High-VOC</td>
</tr>
<tr>
<td>Product F3-p</td>
<td>0 g/L</td>
<td>≤100 g/L</td>
<td>Low-VOC</td>
</tr>
<tr>
<td>Product F3-i</td>
<td>40 g/L</td>
<td>≤100 g/L</td>
<td>Low-VOC</td>
</tr>
<tr>
<td>Product F3-t</td>
<td>66 g/L</td>
<td>≤100 g/L</td>
<td>Low-VOC</td>
</tr>
<tr>
<td>Product G3-p</td>
<td>0 g/L</td>
<td>≤100 g/L</td>
<td>Low-VOC</td>
</tr>
<tr>
<td>Product G3-i</td>
<td>0 g/L</td>
<td>≤100 g/L</td>
<td>Low-VOC</td>
</tr>
<tr>
<td>Product G3-t</td>
<td>0 g/L</td>
<td>≤100 g/L</td>
<td>Low-VOC</td>
</tr>
</tbody>
</table>

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;
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

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
# Clear Wood Finishes (≤ 275 g/l)

<table>
<thead>
<tr>
<th>Coating Company, Product Name, Components</th>
<th>Interior Exterior</th>
<th>VOC content (gm/l)</th>
<th>Solids (% by volume)</th>
<th>Coverage (sq ft/gal)</th>
<th>Recommended Substrate/Exposure</th>
<th>Coating Characteristics</th>
<th>Dry Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>AllPro Corporation, 306 Series X-L Poly Urethane Professional WB Floor Finish, Oil-Modified, Oxygen-Cross-linked Acrylic Urethane</td>
<td>I</td>
<td>200</td>
<td>29</td>
<td>450</td>
<td>Hardwood floors such as lobbies, offices, hotels, schools, hospitals, shopping malls, auditoriums, gymnasiums, dance floors</td>
<td>Fast drying, Outstanding resistance to abrasion and heavy floor traffic, withstands food spills and most janitorial supplies</td>
<td>&lt;1 hr touch 1-3 hr recoat</td>
</tr>
<tr>
<td>Anchor Paints, 2914 Acry-Lac Clear Gloss, Acrylic Emulsion</td>
<td>I/E</td>
<td>187</td>
<td>26</td>
<td>472</td>
<td>Wood, trim, cabinets, paneling and furniture</td>
<td>Exceptional leveling, Fast drying, Rapid film hardness development, superior adhesion, Exceptional water and detergent resistance</td>
<td>10 min touch 45 min recoat</td>
</tr>
<tr>
<td>BEHR, # 15 Log Home Gloss Finish, Acrylate Modified Alkyd Resin</td>
<td>E</td>
<td>150</td>
<td>N/A</td>
<td>200-400</td>
<td>Wood surfaces such as log and timber frame homes, siding, railings, fences</td>
<td>Durable, flexible gloss finish, contains mildewcide and offers UV protection</td>
<td>8-12 hr touch 24 hr recoat</td>
</tr>
<tr>
<td>BEHR, # 300 Natural Clear Waterproofing Wood Protector</td>
<td>E</td>
<td>241</td>
<td>N/A</td>
<td>250-300</td>
<td>Unsealed wood decks, fences, siding, and outdoor furniture</td>
<td>Penetrating oil formula, durable, UV protection, contains mildewcide, can be applied to damp wood and low temperatures</td>
<td>24 hr touch 48 hr recoat 72 hr cure</td>
</tr>
<tr>
<td>BEHR, # 400 Natural Clear Waterproofing Wood Finish, Acrylate Modified Alkyd Resin</td>
<td>E</td>
<td>245</td>
<td>N/A</td>
<td>250-300</td>
<td>Unsealed wood decks, railings, shakes, shingles, siding, fences, furniture</td>
<td>Penetrating oil formula, durable, UV protection, contains mildewcide, can be applied to damp wood and low temperatures</td>
<td>24 hr touch 72 hr cure</td>
</tr>
<tr>
<td>BEHR, # 500 Natural Clear Premium Weatherproofing Wood Finish, Styrene Acrylic Polymers</td>
<td>E</td>
<td>246</td>
<td>N/A</td>
<td>300-350</td>
<td>Unsealed wood decks, railings, shakes, shingles, siding, roofs, fences, furniture</td>
<td>Penetrating oil formula, Silicone based technology enhances waterproofing protection and durability, offers UV protection, contains mildewcide, can be applied to damp wood</td>
<td>24-48 hr touch 72 hr cure</td>
</tr>
<tr>
<td>BEHR, # 780 Crystal Clear WB Polyurethane Premium Plus With Style</td>
<td>I</td>
<td>249</td>
<td>N/A</td>
<td>300-400</td>
<td>Top coat over faux-finished, crackled and textured surfaces</td>
<td>Protects from moisture and wear, dries to a durable, non-yellowing, clear, long-lasting matte finish</td>
<td>1 hr touch 3-4 hr recoat</td>
</tr>
<tr>
<td>Benjamin Moore, 422 High Gloss, 423 Low Lustre Benwood Stays Clear Acrylic Polyurethane</td>
<td>I</td>
<td>275-283</td>
<td>27-28</td>
<td>350-450</td>
<td>Interior wood surfaces including floors</td>
<td>Clear, durable, non-yellowing, low odor, dries quickly, high resistance to abrasion, protection against alcohol, water, and most household chemicals and stains</td>
<td>1 hr touch 2-3 hr recoat</td>
</tr>
<tr>
<td>BonaKemi, Tech Mega Floor Finish Polyurethane WB</td>
<td>I</td>
<td>250</td>
<td>33</td>
<td>500-600</td>
<td>Heavy traffic interior residential &amp; commercial floors</td>
<td>Fast drying, non flammable, excellent flow and leveling, no limited potlife, exceptional build and clarity, gloss, semi-gloss, satin</td>
<td>2-3 hr recoat 7 day cure</td>
</tr>
<tr>
<td>Cloverdale Paint, 42324 Timberloch WB Varnish High Gloss, Acrylic/Urethane</td>
<td>I</td>
<td>241</td>
<td>29</td>
<td>330-500</td>
<td>Wood furniture, shelving, cabinets, doors and other woodworking</td>
<td>Excellent non-yellowing and gloss retention properties, excellent hardness, adhesion, durability and wear resistance, resistant to hot and cold water, household chemicals and alcohol</td>
<td>15 min touch 2 hr recoat</td>
</tr>
<tr>
<td>Color Wheel Paints &amp; Coatings, 121 Optima Acrythane Satin Varnish, WB Urethane Acrylic</td>
<td>I</td>
<td>225</td>
<td>31</td>
<td>300-500</td>
<td>Wood surfaces such as beams, lumber, trim, doors, cabinets, shelving, furniture</td>
<td>Resistant to moisture vapor, excellent mar resistance, rapid dry, washable, good adhesion</td>
<td>1 hr touch 4 hr recoat</td>
</tr>
<tr>
<td>Color Wheel Paints &amp; Coatings, 123 High Gloss Optima Acrythane Spar Varnish, WB Urethane Acrylic</td>
<td>I</td>
<td>227</td>
<td>30</td>
<td>300-500</td>
<td>Wood surfaces such as beams, lumber, trim, doors, cabinets, shelving, furniture</td>
<td>Resistant to moisture vapor, excellent mar resistance, rapid dry, washable, good adhesion</td>
<td>1 hr touch 4 hr recoat</td>
</tr>
<tr>
<td>Columbia Paint &amp; Coatings, # 10-670 Gloss Wood Finishes Clear Acrylic Urethane</td>
<td>I</td>
<td>224</td>
<td>32</td>
<td>360</td>
<td>Cabinets, paneling, molding, furniture</td>
<td>Dries tough, water &amp; alcohol resistant, exceptional flow &amp; leveling, easy to sand, high-build</td>
<td>30 min touch 30-60 min. recoat</td>
</tr>
</tbody>
</table>
### Rule 1113 Future Compliant Coatings
#### 2004-2005 Technology Assessment
December 2005

<table>
<thead>
<tr>
<th>Product Description</th>
<th>VNO</th>
<th>TTS</th>
<th>SAC</th>
<th>Description</th>
<th>Drying Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbia Paint &amp; Coatings, # 10-672 Semi-Gloss</td>
<td>I</td>
<td>221</td>
<td>31-33</td>
<td>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.</td>
<td>30 min touch 30-60 min. recoat</td>
</tr>
<tr>
<td>Wood Finishes Clear Acrylic Urethane</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Columbia Paint &amp; Coatings, # 10-675 Eggshell</td>
<td>I</td>
<td>225</td>
<td>32</td>
<td>Cabinets, paneling, molding, furniture Dries tough, water &amp; alcohol resistant, exceptional flow &amp; leveling, easy to sand, high-build</td>
<td>30 min touch 30-60 min. recoat</td>
</tr>
<tr>
<td>Wood Finishes Clear Acrylic Urethane</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diamond Vogel Paints, Old Masters H2O Acrylic Varnish</td>
<td>I</td>
<td>252</td>
<td>31</td>
<td>Bare and previously finished wood surfaces Fast drying, water reducible, non-yellowing, not for floors,</td>
<td>10 min touch 1 hr recoat</td>
</tr>
<tr>
<td>EPMAR, 2700 Sta-Crete Clear Aliphatic Polyurethane, 2</td>
<td>I/E</td>
<td>0</td>
<td>70</td>
<td>Hospital walls &amp; floors, commercial cement floors, facades, steel and concrete storage tank exteriors, steel &amp; concrete bridges, pump equipment UV resistant, chemical resistant, cures to a very hard resilient film, excellent adhesion, excellent leveling &amp; flow</td>
<td>5 hr touch 72 hr cure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product Description</th>
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<td>Wood Finishes Clear Acrylic Urethane</td>
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<th>TTS</th>
<th>SAC</th>
<th>Description</th>
<th>Drying Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farwest, X-6697 Semi-Gloss Aquathane Waterborne Floor Finish, Modified Aliphatic Urethane Dispersion</td>
<td>I</td>
<td>186</td>
<td>26-28</td>
<td>Hardwood floors, kitchen cabinets, coffee tables, wood furniture, table tops, clear wood trim Non-yellowing, highly durable, stain resistant</td>
<td>30-45 min touch 3 hr recoat</td>
</tr>
<tr>
<td>Fine Paints of Europe, Eurolux Gloss Varnish, Urethane Acrylic</td>
<td>I</td>
<td>126</td>
<td>N/A</td>
<td>New or previously varnished wood Floors, stairs, doors, paneling, furniture Quick-drying, non-yellowing, wear resistant and durable as any solvent borne varnish</td>
<td>45 min touch 4 hr recoat</td>
</tr>
<tr>
<td>Fuhr International, 00 Double Z Self Cross Linking Acrylic Clear Coat</td>
<td>I</td>
<td>0</td>
<td>29</td>
<td>Cabinets, furniture, moldings, millworks Resistant to water and various chemicals, UV resistant, excellent durability, anti-sag formulation, fast dry, self-sealing</td>
<td>20 min sand</td>
</tr>
<tr>
<td>255 WB Urethane Finish</td>
<td></td>
<td></td>
<td></td>
<td>Floors, high end furniture, doors, cabinets, windows Fast dry, durable, superior durability and buff ability, self-sealing</td>
<td>10 min touch 30 min sand</td>
</tr>
<tr>
<td>Fuhr International, 255 WB Urethane Finish</td>
<td>I/E</td>
<td>57</td>
<td>31</td>
<td>Floors, high end furniture, doors, cabinets, windows Fast dry, durable, superior durability and buff ability, self-sealing</td>
<td>10 min touch 30 min sand</td>
</tr>
<tr>
<td>275 Multi-Purpose Ultra Clear Urethane</td>
<td>I</td>
<td>120</td>
<td>30</td>
<td>Tile, concrete, hardwood floorings, high end furniture, doors, millwork, windows, cabinetry Superior durability, wipeable, buffable</td>
<td>10 min touch 30 min sand</td>
</tr>
<tr>
<td>285 Ultra Clear Acrylic Urethane</td>
<td>I</td>
<td>51</td>
<td>27</td>
<td>Hardwood floors, wood furniture, passage doors, windows, cabinetry Superior durability, wipe able, buff able</td>
<td>10 min touch 30 min sand</td>
</tr>
<tr>
<td>Fuhr International, 345 WB Industrial Acrylic Varnish</td>
<td>I</td>
<td>77</td>
<td>33</td>
<td>Kitchen cabinets, furniture, molding, passage doors, millwork, wine racks Excellent water, chemical and scratch resistance, self-sealing, fast dry, excellent durability, anti-sag resistance Pigmented versions</td>
<td>5 min touch 15 min sand</td>
</tr>
<tr>
<td>Fuhr International, 355 WB Acrylic Varnish</td>
<td>I</td>
<td>75</td>
<td>30</td>
<td>Kitchen cabinets, furniture, molding, passage doors, millwork, wine racks Excellent water, chemical and scratch resistance, self-sealing</td>
<td>10 min touch 25 min sand</td>
</tr>
<tr>
<td>Fuhr International, 375 Water Clear Acrylic Varnish</td>
<td>I</td>
<td>50</td>
<td>27</td>
<td>Kitchen cabinets, furniture, molding, passage doors, millwork, wine racks Excellent water, chemical and scratch resistance</td>
<td>10 min touch 20 min sand</td>
</tr>
<tr>
<td>Fuhr International, 5000 ZVOC High Solids Clear Coat, WB Self-Sealing Acrylic</td>
<td>I/E</td>
<td>0</td>
<td>38</td>
<td>Kitchen cabinets, furniture, molding, passage doors, millwork, wine racks Early block resistance, excellent durability, chemical &amp; water resistance, anti-sag resistance, fast dry, self-sealing</td>
<td>5 min touch 20 min sand</td>
</tr>
<tr>
<td>Fuhr International, 5100 ZVOC Medium Solids Clear Coat, WB Self-Sealing Acrylic</td>
<td>I/E</td>
<td>0</td>
<td>29</td>
<td>Kitchen cabinets, furniture, molding, passage doors, millwork, wine racks Early block resistance, excellent durability, chemical &amp; water resistance, fast dry</td>
<td>5 min touch 20 min sand</td>
</tr>
<tr>
<td>Fuhr International, 5200 ZVOC Low Solids Clear Coat, WB Self-Sealing Acrylic</td>
<td>I/E</td>
<td>0</td>
<td>20</td>
<td>Kitchen cabinets, furniture, molding, passage doors, millwork, wine racks Early block resistance, excellent durability, chemical &amp; water resistance, fast dry, uniform sealing</td>
<td>5 min touch 20 min sand</td>
</tr>
<tr>
<td>Fuhr International, 855 Aluminum Oxide Modified Urethane</td>
<td>I/E</td>
<td>57</td>
<td>32</td>
<td>Wood floors Fast dry, long lasting, superior durability, wear resistant, self-sealing</td>
<td>4 hr sand 72 hr cure</td>
</tr>
<tr>
<td>Hallman Lindsay Quality Paints, V364, Clearguard Acrylic Urethane Satin Wood Finish</td>
<td>I</td>
<td>240</td>
<td>31</td>
<td>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.</td>
<td>30 min touch 3 hr recoat</td>
</tr>
<tr>
<td>Company</td>
<td>Product Description</td>
<td>Durability</td>
<td>Application</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hillyard Inc.</td>
<td><em>Tip-Off Gym Finish, WB</em> ACRYLIC URETHANE</td>
<td>Fast dry</td>
<td>Wood floors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICI Paints (Delux), 1802-1808</td>
<td><em>Woodpride WB</em> ACRYLIC URETHANE</td>
<td>1 hr touch</td>
<td>Wood surfaces such as cabinets, doors, paneling, furniture, floors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JFB Hart Coating Inc, HP-146 Clear, WB</td>
<td><em>HP-146 Clear, WB</em> ACRYLIC URETHANE</td>
<td>8 min touch</td>
<td>Steel, aluminum, galvanized metal, concrete/block, masonry, wood</td>
<td></td>
<td></td>
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<tr>
<td>JFB Hart Coatings Inc, HP-105 Clear, Aliphatic Polyurethane, 2</td>
<td><em>HP-105 Clear, Aliphatic Polyurethane</em></td>
<td>4 hr touch</td>
<td>Steel, aluminum, galvanized metal, concrete/block, masonry, wood</td>
<td></td>
<td></td>
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<tr>
<td>Kwal Paint (PPI), 6820 Acrylic Urethane Gloss, Clear</td>
<td><em>Clear</em> ACRYLIC URETHANE</td>
<td>20-30 min touch</td>
<td>For both natural and/or stained wood surfaces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lancos Paints, PV 357-359 &amp; PB</td>
<td><em>15 Minute Drying Polyurethane</em></td>
<td>72 hr cure</td>
<td>Wood surfaces such as furniture, doors, woodwork, cabinets, recommended for floors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing &amp; Consulting Chemists</td>
<td><em>WCX-1XXX Series Clear Topcoats, ACRYLIC URETHANE</em></td>
<td>1 hr recoat</td>
<td>Wood Cabinets, trim, furniture and most wood products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing &amp; Consulting Chemists</td>
<td><em>WHX-1090 High Gloss Acrylic Urethane Clear Topcoats</em></td>
<td>1 hr recoat</td>
<td>Wood Cabinets, trim, furniture and most wood products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minuteman Intl. (Multi-Clean), Court Shield</td>
<td><em>Final Floor Urethane-Acryl</em></td>
<td>2 hr recoat</td>
<td>Wood floors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minuteman Intl. (Multi-Clean), Court Shield</td>
<td><em>ProFloor 100 100% Urethane</em></td>
<td>72 hr cure</td>
<td>Hard, durable, scuff/mark resistant, approved by the Maple Flooring Mfg. Association</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olympic (PPG), 42784 OLYMPIC WB Polyurethane</td>
<td>ACRYLIC URETHANE</td>
<td>2 hr recoat</td>
<td>Wood floors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Para Paints, V180 Woodcare, Clear Gloss</td>
<td>ACRYLIC URETHANE</td>
<td>Superior durability</td>
<td>Superior durability.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Para Paints, V190 Woodcare, Clear Satin,</td>
<td>ACRYLIC URETHANE</td>
<td>Superior durability</td>
<td>For wood floors, trim, cupboards, furniture, paneling, millwork and toys</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pittsburgh Paints (PPG), 77-45 REZ</td>
<td>ACRYLIC URETHANE</td>
<td>Superior durability</td>
<td>Superior durability.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pittsburgh Paints (PPG), 77-49 REZ</td>
<td>ACRYLIC URETHANE</td>
<td>Superior durability</td>
<td>For wood floors, trim, cupboards, furniture, paneling, millwork and toys</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pratt &amp; Lambert Paints, Z39 Clear LACQUER</td>
<td><em>Clear</em> ACRYLIC URETHANE</td>
<td>4 hr recoat</td>
<td>A fast drying, low odor and non-yellowing qualities when applied over latex stains, Excellent adhesion and leveling,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Company</td>
<td>Product Description</td>
<td>Set Time</td>
<td>Touch</td>
<td>Recoat</td>
<td>Notes</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
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<td>----------------------------</td>
</tr>
<tr>
<td>Rockler, Sam Maloof Oil/Wax Finish 58699/58677</td>
<td>All woodworking surfaces Perfect for use over natural wood and woods stained with water-based and oil-based stains, log home walls, furniture, trim, doors and cabinets</td>
<td>24 hr set</td>
<td>24 hr set</td>
<td>24 hr set</td>
<td>Dries crystal clear, durable, non-yellowing, fast drying, protects from common household chemicals, abrasion and scuffing</td>
</tr>
<tr>
<td>SaverSystems, Defy Interior Acrylic Wood Finish</td>
<td>I</td>
<td>&lt;200</td>
<td>NA</td>
<td>200-500</td>
<td>Abrasion resistant, tough, rapid dry, non-yellowing</td>
</tr>
<tr>
<td>Sherwin Williams, 99 Gym-Plex Floor Finish WB Urethane Clear Gloss</td>
<td>I</td>
<td>200</td>
<td>29-31</td>
<td>320-400</td>
<td>Water reducible, excellent film clarity and mar resistance, very good hardness, block resistance and print resistance, excellent blush resistance</td>
</tr>
<tr>
<td>Sherwin Williams, T75-500 Series, Sher-Wood Kem Aqua Lacquer, Acrylic latex</td>
<td>I</td>
<td>240</td>
<td>27</td>
<td>386-531</td>
<td>Crystal varnish, gloss, transparent, ready and easy to use, low odor, self sealing, dries and hardens rapidly, good resistance, excellent flexibility</td>
</tr>
<tr>
<td>Sico Coatings, 194-090 Crystalex Acrylic Latex Varnish</td>
<td>I</td>
<td>101</td>
<td>24</td>
<td>130-150</td>
<td>Ready and easy to use, protects and beautifies wood, low odor, self sealing, dries and hardens rapidly, excellent flexibility</td>
</tr>
<tr>
<td>Sico Coatings, 194-100 Crystalex Acrylic Varnish</td>
<td>I</td>
<td>99</td>
<td>29</td>
<td>NA</td>
<td>Specially recommended on new or bare wooden surfaces or varnished. All species of hard woods or plywood.</td>
</tr>
<tr>
<td>Silvertown Products, Rhimguard Wood Defense</td>
<td>E</td>
<td>0</td>
<td>30</td>
<td>550</td>
<td>Wood decks, house siding, fences</td>
</tr>
<tr>
<td>Target Coatings, 1000 Series Oxford Ultima Spray Lacquer, WB Acrylic</td>
<td>I</td>
<td>250</td>
<td>30</td>
<td>N/A</td>
<td>Kitchen cabinets, commercial case goods, architectural trim, fine furniture, custom woodworking</td>
</tr>
<tr>
<td>Target Coatings, 7000 Series Oxford Hybrid Varnish Oil Varnish/Water Urethane Emulsion</td>
<td>I/E</td>
<td>182</td>
<td>N/A</td>
<td>N/A</td>
<td>Marine and architectural applications</td>
</tr>
<tr>
<td>Target Coatings, 7500 Oxford Ultima Brushing Varnish WB Hybrid Alkyd Urethane/Acrylic</td>
<td>I</td>
<td>275</td>
<td>35</td>
<td>N/A</td>
<td>Trim, doors, window sills, furniture</td>
</tr>
<tr>
<td>Target Coatings, 8000 Entech Precatalyzed WB Conversion Varnish, Oil-modified Resins/Acrylic Copolymers</td>
<td>I/E</td>
<td>80</td>
<td>32</td>
<td>500</td>
<td>Interior/exterior architectural trim, cabinetry, furniture, fixtures, yacht interiors</td>
</tr>
<tr>
<td>Target Coatings, 9000 Series Super-Clear Polyurethane</td>
<td>I</td>
<td>200</td>
<td>30</td>
<td>N/A</td>
<td>Wood surfaces</td>
</tr>
<tr>
<td>Tried &amp; True Wood Finishes, Danish Oil, Original Wood Finish, Varnish Oil Polymerized Linseed Oil</td>
<td>I</td>
<td>0</td>
<td>N/A</td>
<td>600</td>
<td>Kitchen counters, table tops, doors &amp; windows, trimwork, staircases, cabinets and furniture, paneling cutting boards</td>
</tr>
<tr>
<td>Trinity Coatings Company, LW-800 Series Aquaclear Clear WB Urethane</td>
<td>I</td>
<td>254</td>
<td>30</td>
<td>476</td>
<td>Cabinets, paneling, molding, furniture</td>
</tr>
<tr>
<td>Trinity Coatings Company, F-LW-950 WB Clear Acrylic Urethane</td>
<td>I</td>
<td>228</td>
<td>32</td>
<td>512</td>
<td>Kitchen cabinets, furniture</td>
</tr>
<tr>
<td>Trinity Coatings Company, WV-200A Series WB Conversion Varnish</td>
<td>I</td>
<td>57</td>
<td>45</td>
<td>728</td>
<td>Kitchen cabinets, furniture, commercial fixtures</td>
</tr>
<tr>
<td>Valspar (McCloskey), 80-6290 Series Clear Coat, Acrylic Resin</td>
<td>I/E</td>
<td>250</td>
<td>27</td>
<td>400</td>
<td>Properly prepared metal, wood, wallpaper, and plastic laminate surfaces such as cabinets, furniture, walls, entry doors</td>
</tr>
</tbody>
</table>
### Clear Wood Finishes-Sanding Sealers (≤ 275 g/l)

<table>
<thead>
<tr>
<th>Coating Company, Product Name, Components</th>
<th>Interior/Exterior</th>
<th>VOC content (g/m²)</th>
<th>Solids (% by volume)</th>
<th>Coverage (sq ft/gal)</th>
<th>Recommended Substrate/Exposure</th>
<th>Coating Characteristics</th>
<th>Drying Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>AllPro Corporation, Acrylic Urethane WB Satin Sanding Sealer</td>
<td>I</td>
<td>168</td>
<td>29</td>
<td>300-450</td>
<td>Doors, trim, cabinets, furniture</td>
<td>Fast dry, non-flammable, excellent penetration, minimal grain raising</td>
<td>30 min. touch 2-4 hrs recoat</td>
</tr>
<tr>
<td>American Formulating and Manufacturing Safecoat Lock-In Wood Sanding Sealer</td>
<td>I/E</td>
<td>12</td>
<td>N/A</td>
<td>250</td>
<td>New Wood</td>
<td>Reduces grain raising, helps to prevent bleed through of naturally occurring oils, tannin, turp and resins, superior sandability</td>
<td>1 hr touch 2 hr sandable</td>
</tr>
<tr>
<td>Cloverdale Paint, 42114 Timberlox Acrylic Sanding Sealer</td>
<td>I</td>
<td>268</td>
<td>20</td>
<td>300-400</td>
<td>New wood furniture, cabinets and trim, paneling, for use under alkyd and polyurethane varnishes</td>
<td>Fast drying, non-yellowing, penetrates porous wood surfaces, sands easily</td>
<td>10 min touch 1 hr recoat</td>
</tr>
<tr>
<td>Coronado Paints, CLS 3122-11 WB Acrylic Lacquer Sanding Sealer</td>
<td>I</td>
<td>168</td>
<td>29</td>
<td>N/A</td>
<td>Bare or stained wood doors, trim, paneling, furniture, cabinets, fixtures</td>
<td>Dries quickly, sands easily, good hold out under all gloss levels of clear finish</td>
<td>30 min touch 2-4 hr sand 7-10 day recoat</td>
</tr>
<tr>
<td>Diamond Vogel Paints, Old Masters H2O Acrylic Sanding Sealer</td>
<td>I</td>
<td>181</td>
<td>30</td>
<td>240-481</td>
<td>For bare or stained Interior Wood Surfaces</td>
<td>Non-yellowing, fast dry, not for floors</td>
<td>10 min touch 30 min recoat</td>
</tr>
</tbody>
</table>

N/A= Not Available
<table>
<thead>
<tr>
<th>Product Name</th>
<th>Interior</th>
<th>Exterior</th>
<th>VOC Content (gm/l)</th>
<th>Solids (% by volume)</th>
<th>Coverage (sq ft/gal)</th>
<th>Recommended Substrate/Exposure</th>
<th>Coating Characteristics</th>
<th>Drying time to recoat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuhr International, 365 WB Acrylic Clear Sanding Sealer</td>
<td>I/E</td>
<td>50</td>
<td>27</td>
<td>350-450</td>
<td>Various wood surfaces</td>
<td>Great blocking resistance, fast drying, excellent mar resistance, high hardness, minimal to no grain raising</td>
<td>5 min touch 15 min sand</td>
<td></td>
</tr>
<tr>
<td>Fuhr International, 5300 ZVOC Sanding Sealer</td>
<td>I/E</td>
<td>0</td>
<td>20</td>
<td>350-450</td>
<td>Various wood surfaces</td>
<td>Excellent penetration, fast drying</td>
<td>5 min touch 15 min sand</td>
<td></td>
</tr>
<tr>
<td>Fuhr International, 5350 ZVOC High Viscosity Sanding Sealer</td>
<td>I/E</td>
<td>0</td>
<td>20</td>
<td>350-450</td>
<td>Various wood surfaces</td>
<td>Excellent penetration, fast drying</td>
<td>5 min touch 15 min sand</td>
<td></td>
</tr>
<tr>
<td>Fuhr International, 655 Universal Sanding Sealer</td>
<td>I/E</td>
<td>38</td>
<td>15</td>
<td>350-450</td>
<td>Various wood surfaces</td>
<td>Deep penetrating, fast drying, brushable</td>
<td>5 min touch 15 min sand</td>
<td></td>
</tr>
<tr>
<td>Glitsa American Inc, C16021 Snap Dry WB Sealer, Acrylic Polymer Dispersion</td>
<td>I</td>
<td>261</td>
<td>N/A</td>
<td>400-500</td>
<td>Bare wood</td>
<td>Non-yellowing, fast dry, excellent leveling</td>
<td>1.5 - 2.5 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Hillyard Inc, #HIL032006 WB Sanding Seal &amp; Primer</td>
<td>I</td>
<td>&lt;200</td>
<td>N/A</td>
<td>600-800</td>
<td>Wood floors</td>
<td>Fast dry</td>
<td>1 hr touch 4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Manufacturing &amp; Consulting Chemists Inc, WC-2044 Sanding Sealer, WB Acrylic</td>
<td>I</td>
<td>235</td>
<td>28</td>
<td>300-400</td>
<td>Wood cabinets, trims, furniture</td>
<td>Powders well, fast drying, for open grain wood surfaces</td>
<td>30 min. touch 1 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Manufacturing &amp; Consulting Chemists Inc, WCX-2022 Sanding Sealer, WB Self Crosslinking Acrylic</td>
<td>I</td>
<td>265</td>
<td>29</td>
<td>300-400</td>
<td>Wood cabinets, trims, furniture</td>
<td>Powders well, fast drying, for close grain wood surfaces</td>
<td>30 min. touch 1 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Rodda Paint Company, 506600 Aqua Lac Clear Sanding Sealer, WB Acrylic</td>
<td>I</td>
<td>124</td>
<td>33</td>
<td>200-300</td>
<td>Wood</td>
<td>Excellent flow, build, and sanding properties, non-toxic</td>
<td>10 min touch 30 min sand</td>
<td></td>
</tr>
<tr>
<td>Spectra-Tone Paint Corporation, #045 Spectra-Lac Water Reducible White Pigmented Sanding Sealer, Styrene/Acryl Copolymer Emulsion</td>
<td>I</td>
<td>245</td>
<td>36</td>
<td>350-450</td>
<td>Cabinet work, molding, doors, trim, jambs.</td>
<td>Fast dry, easily sanded, good hiding and enamel holdout</td>
<td>20 min touch 45 min sand 2 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Target Coatings, 8800 Emtech WB Universal Sealer</td>
<td>I/E</td>
<td>200</td>
<td>40</td>
<td>N/A</td>
<td>Fine furniture construction, residential and commercial architectural finishing, marine application</td>
<td>UV stable, non-yellowing, exceptional adhesion to woods with high oil content, excellent water resistance</td>
<td>1 hr sand &amp; recoat</td>
<td></td>
</tr>
<tr>
<td>Trinity Coatings Company, SW-500 Nitro Aqualac Clear WB Lacquer Sealer</td>
<td>I</td>
<td>107</td>
<td>27</td>
<td>450</td>
<td>Cabinets, paneling, molding, furniture</td>
<td>Acrylic emulsion polymer, durable finish, steared for easy sanding, water and alcohol resistant finish</td>
<td>15-20 min touch 30-40 min sand 30-40 min recoat</td>
<td></td>
</tr>
<tr>
<td>Vista Paint, 107 Acrithane Sanding Sealer</td>
<td>I</td>
<td>242</td>
<td>28</td>
<td>400-700</td>
<td>Woodwork, cabinets, furniture, paneling</td>
<td>Excellent durability, water &amp; chemical resistant, minimal grain raise, fast dry</td>
<td>1 hr touch 2 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Vista Paint, TC10 WB Sanding Sealer</td>
<td>I</td>
<td>241</td>
<td>30</td>
<td>850-950</td>
<td>Woodwork, cabinets, furniture, paneling</td>
<td>Excellent durability, water &amp; chemical resistant, minimal grain raise, fast dry</td>
<td>1 hr touch 2 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Zinsser (Parks Corp.), Safe &amp; Simple WB Sanding Sealer</td>
<td>I</td>
<td>248-249</td>
<td>26</td>
<td>400</td>
<td>For woods such as hardwoods, softwoods, plywood, paricle board or masonite</td>
<td>Seals wood pores completely, sanding not necessary if topcoated within 6 hours</td>
<td>30-45 min touch 36 hr cure for oil</td>
<td></td>
</tr>
</tbody>
</table>

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

### Pigmented Lacquers (≤ 275 g/l)

<table>
<thead>
<tr>
<th>Coating Company, Product Name, Components</th>
<th>Interior</th>
<th>Exterior</th>
<th>VOC Content (gm/l)</th>
<th>Solids (% by volume)</th>
<th>Coverage (sq ft/gal)</th>
<th>Recommended Substrate/Exposure</th>
<th>Coating Characteristics</th>
<th>Drying time to recoat</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEHR, #401, 402, 403 Pigmented Waterproothing Wood Finish, Acrylate Modified Alkyd Resin</td>
<td>E</td>
<td>245</td>
<td>N/A</td>
<td>250-300</td>
<td>Unsealed wood decks, railings, shakes, shingles, siding, fences, furniture</td>
<td>Penetrating oil formula, durable, UV protection, contains mildewcide, can be applied to dampwood and low temperatures</td>
<td>24 hr touch 72 hr cure</td>
<td></td>
</tr>
<tr>
<td>Coating Company, Product Name, Components</td>
<td>Interior Exterior</td>
<td>VOC content (gm/l)</td>
<td>Solids (% by volume)</td>
<td>Coverage (sq ft/gal)</td>
<td>Recommended Substrate/Exposure</td>
<td>Coating Characteristics</td>
<td>Dry Time</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>------------------</td>
<td>-------------------</td>
<td>----------------------</td>
<td>----------------------</td>
<td>-------------------------------</td>
<td>------------------------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>Fuhr International, 9100 Series Universal Acrylic Topcoat Opaque</td>
<td>I</td>
<td>25</td>
<td>35</td>
<td>N/A</td>
<td>Shutters, trim, doors, molding, cabinetry, furniture</td>
<td>Excellent mar resistance, anti-sagging, fast drying, high hardness</td>
<td>8 min touch 30 min sand</td>
<td></td>
</tr>
<tr>
<td>JBF Hart Coating Inc, HP-146 Custom Colors, WB Aliphatic Polyurethane, Single Component</td>
<td>I/E</td>
<td>135-175</td>
<td>30</td>
<td>240-400</td>
<td>Steel, aluminum, galvanized metal, concrete/block, masonry, wood</td>
<td>Gloss retention, non-yellowing, good chemical and abrasion resistance, long-term durability, fast-dry, great adhesion, self-leveling, UV protection</td>
<td>8 min touch 30 min recoat</td>
<td></td>
</tr>
<tr>
<td>Manufacturing &amp; Consulting Chemists Inc, WCX-3XXX Series Pigmented Topcoats WB Acrylic</td>
<td>I</td>
<td>250</td>
<td>29-31</td>
<td>300</td>
<td>Furniture, cabinets and most wood products</td>
<td>Tough durable protective coatings, excellent block and print resistance, excellent abrasion and mar resistance, fast dry</td>
<td>30 min touch 1 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Silvertown Products, RhinoGuard Furniture Stain and Finish</td>
<td>I</td>
<td>0</td>
<td>N/A</td>
<td>N/A</td>
<td>Furniture, doors, wood beams</td>
<td>Fade Resistant, resistant to many oils and greases, contains Gilsonite</td>
<td>24 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Silvertown Products, RhinoGuard Wood Defense</td>
<td>E</td>
<td>0</td>
<td>30</td>
<td>550</td>
<td>Wood, decks, siding</td>
<td>UV, scuff, water, mildew and fungus resistant contains Gilsonite</td>
<td>24 hrs to walk 72 hrs recoat</td>
<td></td>
</tr>
<tr>
<td>Spectra-Tone Paint Corporation, #296 Spectra-Lac Water Reducible White Lacquer, Styrene/Acrylic Copolymer Emulsion</td>
<td>I/E</td>
<td>250</td>
<td>38</td>
<td>400-450</td>
<td>For use on wood trim, molding and designer furniture, new or previously painted wood, masonry, metal, plaster or drywall surfaces.</td>
<td>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.</td>
<td>20 min touch 2 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Trinity Coatings Company, LW-840 Nitro Beige WB Urethane</td>
<td>I</td>
<td>194</td>
<td>34</td>
<td>547</td>
<td>Furniture, store fixtures, kitchen cabinets, metal parts</td>
<td>Acrylic urethane, flexible, hard, chemical and abrasion resistant, multiple colors</td>
<td>15-30 min touch 35-45 min handle 1 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Trinity Coatings Company, F-LW-4000 Series Aqualac White WB Lacquer</td>
<td>I</td>
<td>100</td>
<td>34</td>
<td>549</td>
<td>Cabinets, paneling, molding, furniture</td>
<td>Acrylic emulsion polymer, durable finish, dries tough, water and alcohol resistant, UV stabilized for a non-yellow finish</td>
<td>15-30 min touch 35-45 min handle 35-45 min recoat</td>
<td></td>
</tr>
<tr>
<td>Trinity Coatings Company, LW-4500 Series WB Quick Dry Lacquer</td>
<td>I</td>
<td>90-116</td>
<td>31</td>
<td>451-505</td>
<td>Properly prepared wood or metal surfaces sall décor items, home furnishings, picture frames,</td>
<td>Acrylic emulsion polymer, durable finish, dries tough, water and alcohol resistant, high build, multiple colors</td>
<td>13-30 min touch 1 hr recoat</td>
<td></td>
</tr>
</tbody>
</table>

N/A= Not Available

**Floor Coatings (≤ 50 g/l)**

<table>
<thead>
<tr>
<th>Coating Company, Product Name, Components</th>
<th>Interior Exterior</th>
<th>VOC content (gm/l)</th>
<th>Solids (% by volume)</th>
<th>Coverage (sq ft/gal)</th>
<th>Recommended Substrate/Exposure</th>
<th>Coating Characteristics</th>
<th>Dry Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andek, Polafloor Colorcoat WB Acrylic Copolymer</td>
<td>I/E</td>
<td>50</td>
<td>N/A</td>
<td>200-250</td>
<td>Firm painted surfaces, concrete, wood</td>
<td>Resists UV, mildew, chemical attack; has alkali resistance, protects substrate from wear, water, and chemical attack, fast dry</td>
<td>N/A</td>
</tr>
<tr>
<td>Degussa (ChemRex Inc/Sonneborne), Tuf-trac Tennis Green</td>
<td>I/E</td>
<td>0</td>
<td>47</td>
<td>70-125</td>
<td>Asphalt and Concrete tennis courts, playgrounds, arenas, walkways, balconies, steps, bike paths</td>
<td>Durable, non-glare, slip-resistant safety flat finish, resists weathering</td>
<td>4 hr recoat 24-36 hr cure</td>
</tr>
<tr>
<td>Farwest, #2001 Series, Deck-Safe Waterborne Pigmented Acrylic Deck Coatings</td>
<td>E</td>
<td>37</td>
<td>46</td>
<td>100</td>
<td>For use on wood, steel, aluminum or concrete/masonry surfaces such as decks, porches, walkways, ramps, steps, boat decks, bridgways</td>
<td>Withstands rough weather, non-slip aggregate coating, various colors</td>
<td>1 hr touch 24 hr touch</td>
</tr>
<tr>
<td>Florock Seamless Systems, System 4700 High Speed Epoxy, 2</td>
<td>I</td>
<td>0</td>
<td>100</td>
<td>100</td>
<td>Ideal for use over existing coatings that are well-bonded and properly prepared.</td>
<td>An economical, 2 component, 100% solids epoxi concrete floor resurfacer. Cures quickly for durability, contains no solvents and is low odor.</td>
<td>1-1/2-2 hr touch 3-4 hr recoat</td>
</tr>
<tr>
<td>Gaco Western Inc, GacoFlex U-62 Urethane, 2</td>
<td>I/E</td>
<td>0</td>
<td>100</td>
<td>1600</td>
<td>High-build base and finish for mechanical room floors, walking decks and vehicular traffic decks on floors of plywood, concrete and metal</td>
<td>Good hydrolytic stability, good resistance to inorganic bases, acids and hydrocarbon solvents, fair resistance to oxygenated and chlorinated solvents, weather and wear resistant, tough</td>
<td>8 hr set 18-24 hr foot traffic +24 hr vehicle traffic</td>
</tr>
<tr>
<td>Company/Manufacturer</td>
<td>Product Name</td>
<td>T</td>
<td>V</td>
<td>G</td>
<td>Description</td>
<td>Properties</td>
<td>Notes</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------</td>
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<td>-------</td>
</tr>
<tr>
<td>ITW Resin Technologies, IMPAX 650 SL Epoxy</td>
<td>I 0 100 160 Self-leveling floor coating for concrete/wood and painted surfaces</td>
<td>Full gloss finish, high chemical resistance</td>
<td>8 hr recoat</td>
<td>24 hr foot traffic</td>
<td>5 day cure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key Resin Company, 420 Key 100% Solids Urethane Coating</td>
<td>I &lt;25 &gt;98 160 100% solids, polyurethane floor coating designed to provide high gloss, UV stable, chemical resistant protection, clear or pigmented.</td>
<td>Low odor for use in occupied areas, chemical &amp; stain resistant, easy application, UV stable.</td>
<td>4-5 hr touch</td>
<td>12-24 hr recoat</td>
<td>7 day full cure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key Resin Company, 520 100% Solids Epoxy Coating</td>
<td>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.</td>
<td>Low odor for use in occupied areas, chemical &amp; stain resistant, easy application, provides a smooth, high gloss finish.</td>
<td>10-12 hr touch</td>
<td>12-16 hr recoat</td>
<td>5 day full cure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key Resin Company, 625 Key Chemical Resistant Epoxy Coating</td>
<td>I 0 100 100 100% solids epoxy and modified novolac epoxy floor coating designed to provide high chemical resistant protection, available in multiple colors.</td>
<td>Superior chemical &amp; 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.</td>
<td>6-8 hr touch</td>
<td>12-16 hr recoat</td>
<td>5 day full cure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key Resin Company, 2075 Key 100% Solids Epoxy Coating</td>
<td>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.</td>
<td>Low odor for use in occupied areas, chemical &amp; stain resistant, easy application, provides a smooth, high gloss finish.</td>
<td>10-12 hr touch</td>
<td>12-16 hr recoat</td>
<td>5 day full cure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monopole Inc, Monochem Aqueaseal W20</td>
<td>I/E 0 20 200-500 Horizontal concrete floors, decks, docks, ramps and pavements</td>
<td>Penetrating, acrylic-modified inorganic silicate-base solution. Resists penetration of oil &amp; chemicals and the effects of salt and water, breathable abrasion-resistant</td>
<td>30 min touch</td>
<td>24 hr foot traffic</td>
<td>7 day cure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polyspec, TuffRez 236 Polyurethane Coating</td>
<td>E 4 66 350 Recommended uses include laboratories, hospitals, educational facilities, animal holding areas, chemical processing plants and marine living quarters.</td>
<td>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, fabricating oils, solvents and chemicals, excellent abrasion resistance.</td>
<td>3 hr recoat</td>
<td>1 hr touch</td>
<td>3 day recoat</td>
<td>24 hr cure</td>
<td></td>
</tr>
<tr>
<td>Resene Paints Limited, D313 Non-Skid Deck &amp; Path</td>
<td>I/E 50 N/A 83-163 Bitumen, concrete decks</td>
<td>Excellent abrasion and durability, high film build, excellent traction</td>
<td>N/A</td>
<td>1 hr touch</td>
<td>3 hr recoat</td>
<td>24 hr cure</td>
<td></td>
</tr>
<tr>
<td>Resene Paints Limited, RA43 Aquapoxy for Flooring, WB Epoxy</td>
<td>I/E 50 N/A 457 Bitumen, dairy, food processing garage, meat work floors, primed steel</td>
<td>Excellent abrasion and durability resistance, excellent solvent resistance, fair acid resistance, excellent alkali resistance</td>
<td>10 hr touch</td>
<td>24-120 hr recoat</td>
<td>24 hr cure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seal-Krete Inc, Seal-Krete Floor-Tex Proformance, Acrylic, Non-Slip Textured Coating</td>
<td>I/E 0 70 200 Concrete and masonry surfaces such as walkways, patios, pool decks, stairs, balconies, ramps, driveways</td>
<td>Durable, anti-skid, waterproof, weather-resistant, impact resistant, oil resistant, chlorine resistant, UV resistant</td>
<td>6 hr recoat</td>
<td>24 hr foot traffic</td>
<td>48 hr vehicle traffic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sierra Performance (Rust-Oleum), S-40, S-42 Epoxy Concrete Enamel</td>
<td>I/E 0 45-52 90-175@ 3/4-8 mils Concrete floors in areas of light to medium vehicle traffic occasional chemical spills</td>
<td>Excellent durability, good chemical resistance against mild corrosive and chemical environments</td>
<td>30 min touch</td>
<td>1-2 hr recoat</td>
<td>72 hr cure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tamms Industries, Duralkote 240, High Build Flexible Epoxy</td>
<td>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.</td>
<td>High build flexible epoxy coating, two component, designed for use as a wall and floor coating. Excellent chemical and abrasion resistance.</td>
<td>4-6 hr tackfree</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thortex America, Inc., Floor-Tech H.B. Epoxy Coating</td>
<td>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.</td>
<td>High performance solvent free ceramic reinforced heavy duty coating, simply sate and easy to use, optimal level of adhesion, abrasion, impact and chemical resistance.</td>
<td>6 hr touch</td>
<td>7 day full cure</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Rule 1113 Future Compliant Coatings
#### 2004-2005 Technology Assessment
December 2005

Thortex America, Inc.,  
**Floor-Tech W.B. Epoxy Finish**,  
2, Water-Based  

<table>
<thead>
<tr>
<th>Coating Company, Product Name, Components</th>
<th>Primer/Sealer</th>
<th>Intermediate</th>
<th>Topcoat,</th>
<th>VOC content (gm/l)</th>
<th>Solids (% by volume)</th>
<th>Coverage (sq ft/gal)</th>
<th>Recommended Substrate/Exposure</th>
<th>Coating Characteristics</th>
<th>Dry Time</th>
<th>Pot Life @70 deg./Shelf Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ameron International, Amercoat 133, Epoxy Coating 2</td>
<td>P</td>
<td>72</td>
<td>100</td>
<td>200-401</td>
<td>Tank and water pipe lining, repair tank bottoms including water, fuel, selected chemical tanks, repair pitted steel surfaces</td>
<td>Excellent chemical, solvent and water immersion resistance</td>
<td>24 hr hard dry</td>
<td>2 hr/1 yr</td>
<td>10-30 hr recoat</td>
<td>14 day final cure</td>
</tr>
<tr>
<td>Ameron International, Amercoat 182, Spash Zone Barrier Coating, Epoxy, 2 (resin + cure)</td>
<td>P/T</td>
<td>1</td>
<td>100</td>
<td>1604</td>
<td>Steel in fresh or salt water, underwater pipes, pilings, bracings, water line structures, and retaining walls</td>
<td>Can be applied and cures underwater, excellent cathodic disbondment resistance, excellent water, chemical and solvent resistance, effective corrosion barrier</td>
<td>5 hr set</td>
<td>1 hr/1 yr</td>
<td>24-72 hr cure</td>
<td></td>
</tr>
<tr>
<td>Ameron International, Amercoat 333, Epoxy Coating 2</td>
<td>T</td>
<td>71</td>
<td>100</td>
<td>200</td>
<td>Ballast, fuel, selected chemical tanks, repair pitted steel structures</td>
<td>Excellent chemical, solvent and water immersion resistance, edge retentive</td>
<td>24 hr hard dry</td>
<td>2 hr/1 yr</td>
<td>10-30 hr recoat</td>
<td>7 day final cure</td>
</tr>
<tr>
<td>Ameron International, Amerlock Sealer, Epoxy 2</td>
<td>S</td>
<td>0</td>
<td>100</td>
<td>1069</td>
<td>Penetrating sealer for steel, concrete, galvanizing, stainless steel, aluminum and old coatings</td>
<td>Solvent free, penetrates rust, adheres to aged coatings, resists high humidity, excellent corrosion resistance</td>
<td>12 hr touch</td>
<td>1 hr/1 yr</td>
<td>24 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Ameron International, Dimetcote 21-5, WB Inorganic-Zinc Silicate 2 (Liquid + Powder)</td>
<td>P</td>
<td>0</td>
<td>91</td>
<td>336</td>
<td>Steel bridges, cranes, offshore platforms, fabricated structures exposed to severe weathering, marine environments or moderate chemical fumes</td>
<td>Fast drying, rapid water resistance, resistant to mudcracking</td>
<td>3 min touch</td>
<td>8 hr/ N/A</td>
<td>6 min recoat</td>
<td>8-24 hr cure</td>
</tr>
<tr>
<td>Ameron International, Nu-Klad 100A, Epoxy Surfacer, 3</td>
<td>I/T</td>
<td>4</td>
<td>100</td>
<td>28-43</td>
<td>Mining and metal finish operations, chemical processing plants, power facilities, sewage and waste water treatment plants, pulp and paper, textile and steel mills</td>
<td>Solvent free surfacer that resists wide range of acids, alkalis and solvents. With stands heavy traffic and abrasion. Excellent adhesion</td>
<td>10 hr touch</td>
<td>1 hr/1 yr</td>
<td>28 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Ameron International, Nu-Klad 103N, Epoxy Novolac Floor Coating, 2</td>
<td>T</td>
<td>6</td>
<td>100</td>
<td>160</td>
<td>Concrete floors in food and beverage processing facilities, electronic equipment plants, industrial, commercial, laboratory, pharmaceutical, power and wastewater/sewage plants</td>
<td>Chemical resistance, high gloss</td>
<td>24 hr walk</td>
<td>40 min/1 yr</td>
<td>7 day cure</td>
<td></td>
</tr>
<tr>
<td>Ameron International, Nu-Klad 105A, Epoxy 2</td>
<td>P/S</td>
<td>0</td>
<td>100</td>
<td>250-400</td>
<td>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</td>
<td>Solvent free epoxy for concrete that has been water-cured and properly prepared. Can be used as a curing compound. Absorbs into concrete</td>
<td>17 hr touch</td>
<td>1 hr work time/1 yr</td>
<td>24 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Ameron International, Nu-Klad 120A, Epoxy Surfacer, 3 (resin, cure, powder)</td>
<td>I</td>
<td>0</td>
<td>100</td>
<td>88</td>
<td>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</td>
<td>Spreaderable, self-leveling epoxy concrete surfacer which yields a smooth, cleanable, chemical-resistant floor</td>
<td>3 hr touch</td>
<td>¾ hr/1 yr</td>
<td>16 hr recoat</td>
<td>2 day cure</td>
</tr>
</tbody>
</table>
## Rule 1113 Future Compliant Coatings

### 2004-2005 Technology Assessment

#### December 2005

<table>
<thead>
<tr>
<th>Element</th>
<th>I/T</th>
<th>100</th>
<th>160</th>
<th>Coating Description</th>
<th>Adhesion and Abrasion Resistance</th>
<th>Recoat Time</th>
<th>Life Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ameron International, Nu-Klad 126, Epoxy Floor Coating</td>
<td>38</td>
<td>100</td>
<td>160</td>
<td>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</td>
<td>Excellent adhesion and abrasion resistance, impact resistant, high-gloss</td>
<td>6 hr touch</td>
<td>40 min/1yr</td>
</tr>
<tr>
<td>Ameron International, Nu-Klad 127, Epoxy Coating</td>
<td>0</td>
<td>100</td>
<td>267</td>
<td>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</td>
<td>Seals porous concrete, reduces bubbling of self-leveling topcoats, new concrete or refurbishment, smooths rough surface</td>
<td>5 hr touch</td>
<td>30 min/1yr</td>
</tr>
<tr>
<td>Ameron International, PSX 758, Siloxane Surfacer, 3 (resin, cure, powder)</td>
<td>12</td>
<td>100</td>
<td>2935 per mil</td>
<td>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</td>
<td>Resists a wide range of acids, alkalies and solvents, excellent adhesion, abrasion resistant, resists cracking and lifting</td>
<td>10 hr touch</td>
<td>2 hr/1yr</td>
</tr>
<tr>
<td>Andek, PolaFloor Epoxy Topping, 2</td>
<td>T</td>
<td>0</td>
<td>N/A</td>
<td>Floors in chemical plants, machine shops, plating works, breweries</td>
<td>Fast setting, rapid strength build, extreme resistance to wear, impact and chemical attack</td>
<td>4 hr work time</td>
<td>40 min/12 months</td>
</tr>
<tr>
<td>Andek, PolaFloor P.U.R. Brushable, Kevlar Modified Urethane, 3</td>
<td>T</td>
<td>0</td>
<td>N/A</td>
<td>Industrial floors, tanks, pits, gullies, secondary containment</td>
<td>Highly impermeable to fluids, resists the leaching of chemicals through the coatings, tough wear-resistant surface that resists impact and abrasion</td>
<td>40 min work time</td>
<td>20 min/12 months</td>
</tr>
<tr>
<td>Andek, Wearcoat 1802 Aliphatic Urethane, 2</td>
<td>P/T</td>
<td>0</td>
<td>N/A</td>
<td>Concrete, masonry, metal, and stone</td>
<td>Excellent hydrolytic stability, UV resistance, high tensile strength, withstands heavy use and environmental attack, resists color fade</td>
<td>4 hr tack free</td>
<td>2½ hrs/12 months</td>
</tr>
<tr>
<td>Arcor Epoxy Technologies, Arcor EE-11 Primer, Amine Cured Epoxy, 2</td>
<td>P</td>
<td>0</td>
<td>100</td>
<td>23-80</td>
<td>For steel and metal alloys in immersion service. Ideally suited for aggressive water service. Contains zinc-phosphate.</td>
<td>Corrosion inhibiting, excellent water and alkali resistance, good resistance to organic solvents</td>
<td>6-12 hr tack free</td>
</tr>
<tr>
<td>Arcor Epoxy Technologies, Arcor EE-101, Amine Cured Epoxy Novolac, 2</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
<td>160</td>
<td>Designed for use in the most aggressive chemical and high temperature environments, on ferrous and non-ferrous metals and concrete.</td>
<td>Excellent water, chemical and alkali resistance, good abrasion and flexibility, clear.</td>
<td>1-8 hr recoat</td>
</tr>
<tr>
<td>Arcor Epoxy Technologies, Arcor EE-111, Amine Cured Epoxy Novolac, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>20-80</td>
<td>Suitable for immersion and non-immersion service, high functionality epoxy for secondary containment areas.</td>
<td>Excellent Chemical resistance, very good abrasion resistant and flexibility.</td>
<td>2-8 hr tack free</td>
</tr>
<tr>
<td>Arcor Epoxy Technologies, Arcor EE-121, Amine Cured Epoxy Novolac, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>26-80</td>
<td>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.</td>
<td>Excellent chemical resistance, very good abrasion resistant and good flexibility.</td>
<td>1-3 hr tack free</td>
</tr>
<tr>
<td>Arcor Epoxy Technologies, Arcor EE-951, Amine Cured Epoxy Novolac, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>For patching</td>
<td>Designed particularly as a rebuilding material for metals in highly aggressive chemical and temperature immersion service. Ideally suited for resorption or cladding material for corrosion and abrasion protection.</td>
<td>Excellent chemical resistant and abrasion, good flexibility, corrosion protection.</td>
<td>1-2 hr recoat</td>
</tr>
<tr>
<td>Arcor Epoxy Technologies, Arcor S-15, Amine Cured Epoxy, 2</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
<td>80-160</td>
<td>Suitable for immersion and non-immerision service, Suitable for large tank linings and secondary containment concrete. Suitable for hand or spray application on metals or concrete.</td>
<td>Chemical resistant on ferrous metals and concrete, excellent flexibility.</td>
<td>6-14 hr tack free</td>
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</tbody>
</table>

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<table>
<thead>
<tr>
<th>Arcor Epoxy Technologies, Arcor S-16, Amine Cured Epoxy, 2</th>
<th>P/T</th>
<th>0</th>
<th>100</th>
<th>20-80</th>
<th>Designed as a protective coating for metals in immersion service. Ideally suited for aggressive water service.</th>
<th>Chemical resistant, flexible coating.</th>
<th>5-8 hr recoat 3 day full cure</th>
<th>30 min/3 yrs</th>
</tr>
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<tbody>
<tr>
<td>Arcor Epoxy Technologies, Arcor S-20, Amine Cured Epoxy Novolac, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>29252</td>
<td>Designed as a protective coating for metals in highly aggressive environments especially caustics and acids.</td>
<td>Abrasion &amp; chemical resistant, low friction coating.</td>
<td>5-8 hr recoat 3 day full cure</td>
<td>35 min/3 yrs</td>
</tr>
<tr>
<td>Arcor Epoxy Technologies, Arcor S-30 Primer, Amine Cured Epoxy Novolac, 2</td>
<td>P</td>
<td>0</td>
<td>100</td>
<td>23-80</td>
<td>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.</td>
<td>Corrosion inhibiting, excellent water and alkali resistance, good resistance to organic solvents. Contains zinc-phosphate.</td>
<td>6-12 hr tack free 2-12 hr recoat</td>
<td>40 min/3 yrs</td>
</tr>
<tr>
<td>Arcor Epoxy Technologies, Arcor S-30, Amine Cured Epoxy Novolac, 2</td>
<td>P</td>
<td>0</td>
<td>100</td>
<td>27-80</td>
<td>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.</td>
<td>Corrosion inhibiting, excellent water and alkali resistance, good resistance to organic solvents. Contains zinc-phosphate.</td>
<td>6-10 hr tack free 2-10 hr recoat</td>
<td>25 min/3 yrs</td>
</tr>
<tr>
<td>Arcor Epoxy Technologies, Vicor EE-70, Amine Cured Epoxy, 2</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
<td>20-80</td>
<td>For tanks, pipe, flooring, acid/caustic splash zones, potable water, food contact areas, wastewater tanks, sewer pipe, petrochemical tanks, structural steel.</td>
<td>Moisture insensitive, good chemical &amp; abrasion resistant.</td>
<td>5-8 hr recoat 3 day full cure</td>
<td>35 min/3 yrs</td>
</tr>
<tr>
<td>Arcor Epoxy Technologies, Vicor EE-75, Epoxy Novolac, 2</td>
<td>P/T</td>
<td>0</td>
<td>99.6</td>
<td>80</td>
<td>Aggressive chemical secondary containment areas, industrial floorings.</td>
<td>Excellent chemical resistance, very good abrasion resistance, good flexibility.</td>
<td>2-14 hr recoat 1 day full cure</td>
<td>35 min/3 yrs</td>
</tr>
<tr>
<td>Arcor Epoxy Technologies, Vicor EE-78, Amine Cured Epoxy, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>50-150</td>
<td>Floor coating, ideal for metals, concrete and wood.</td>
<td>Low viscosity, impact resistant, good chemical resistance and very good abrasion resistance, water insensitive.</td>
<td>8-14 hr recoat 7 day full cure</td>
<td>35 min/3 yrs</td>
</tr>
<tr>
<td>Arcor Epoxy Technologies, Vicor EE-79, Epoxy floor leveler, 2</td>
<td>S</td>
<td>0</td>
<td>100</td>
<td>150</td>
<td>Concrete flooring, secondary containment, acid/caustic splash zones, hazardous waste storage areas.</td>
<td>Low viscosity, seals cracks and fills pits, smooth finish, fair to good chemical resistance, very good abrasion resistance and flexibility.</td>
<td>5-6 hr recoat 3 day full cure</td>
<td>30 min/3 yrs</td>
</tr>
<tr>
<td>Arcor Epoxy Technologies, Arcor Arcrete, Amine Cured Epoxy, 2</td>
<td>P</td>
<td>0</td>
<td>100</td>
<td>160</td>
<td>Designed for use in repair of concrete in areas exposed to aggressive chemicals. Secondary containment, flooring, concrete tank supports, chemical drain troughs.</td>
<td>Fair to excellent chemical resistance, very good abrasion resistant and fair flexibility.</td>
<td>6-12 hr recoat 3 day full cure</td>
<td>30 min/3 yrs</td>
</tr>
<tr>
<td>Arcor Epoxy Technologies, Arcor Spraythane, Amine Cured Epoxy/urethane, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>27-80</td>
<td>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.</td>
<td>Chemical &amp; abrasion resistant, excellent flexibility.</td>
<td>6-12 hr recoat 3 day full cure</td>
<td>55 min/3 yrs</td>
</tr>
<tr>
<td>Arcor Epoxy Technologies, Vicor EE-10, Amine cured Epoxy Novolac, 2</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
<td>160</td>
<td>For aggressive chemical tank linings and secondary containment areas, tough chemical resistant coating on ferrous and non-ferrous metals and concrete.</td>
<td>Excellent for 98% sulfuric acid immersion, coating suitable for immersion, chemical resistant, very good abrasion resistance and flexibility.</td>
<td>3-14 hr recoat 7 day full cure</td>
<td>25 min/3 yrs</td>
</tr>
<tr>
<td>Arcor Epoxy Technologies, Vicor EE-11, Amine Cured Epoxy Novolac, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>20-80</td>
<td>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.</td>
<td>Very good abrasion and flexibility, chemical resistant.</td>
<td>6-14 hr tack free 2-14 hr recoat</td>
<td>25 min/3 yrs</td>
</tr>
<tr>
<td>Arcor Epoxy Technologies, Vicor EE-15, Amine Cured Epoxy Novolac, 2</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
<td>20-80</td>
<td>Suitable for immersion and non-immersion service, for ferrous metals and concrete.</td>
<td>Excellent chemical resistant and very good flexibility.</td>
<td>6-14 hr tack free 2-14 hr recoat</td>
<td>25 min/3 yrs</td>
</tr>
<tr>
<td>Benjamin Moore, M04 Acrylic Metal Primer</td>
<td>P/T</td>
<td>51</td>
<td>40</td>
<td>320</td>
<td>Metal including galvanized, barrier coat over zinc coated surfaces, damp surfaces, poured or cast concrete and brick</td>
<td>Rust inhibitive, fast dry, excellent adhesion</td>
<td>30 min touch 2 hr recoat</td>
<td>Single Component</td>
</tr>
<tr>
<td>Product Name</td>
<td>Manufacturer</td>
<td>Application</td>
<td>Dry Time</td>
<td>Pot Life</td>
<td>Adhesion</td>
<td>Remarks</td>
<td></td>
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<tr>
<td>M35 Epoxy Penetrating Bonding Sealer/Finish</td>
<td>Benjamin Moore,</td>
<td>200-400 @4-8 mils</td>
<td>4 hr touch</td>
<td>1 hr</td>
<td>Excellent abrasion resistance, excellent color retention, self-leveling, resists most chemical stains, non-flammable, high build</td>
<td>4 hr touch, 7 day cure, 1-1½ hr pot life</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M40 100% Solids Epoxy Floor Coating</td>
<td>Benjamin Moore,</td>
<td>200</td>
<td>8 hr touch</td>
<td>12 hr recoat</td>
<td>Excellent abrasion resistance, excellent color retention, self-leveling, resists most chemical stains, non-flammable, high build</td>
<td>30 min pot life</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M79/M80 100% Solids Epoxy Novolac</td>
<td>Benjamin Moore,</td>
<td>150@11 mils</td>
<td>8 hr touch</td>
<td>12 hr recoat</td>
<td>Excellent abrasion resistance, excellent color retention, self-leveling, resists most chemical stains, non-flammable, high build</td>
<td>30 min pot life</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M35 Epoxy Penetrating Bonding Sealer/Finish</td>
<td>Blome International,</td>
<td>EC-200, High Performance Vinyl Ester Coating, 2 or 3</td>
<td>8 hr dry</td>
<td>3-5 months</td>
<td>Excellent abrasion resistance, excellent color retention, non-flammable, high build</td>
<td>30-35 min/3 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC-56LV, High Performance Polysulfide Coatings, 2 or 3</td>
<td>Blome International,</td>
<td>11 to 24@60 to 70 mils</td>
<td>36 hr cure before service</td>
<td>30-35 min/6 months</td>
<td>Chemical and water resistant coating and lining system, good flexibility</td>
<td>12 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC-66, High Performance Epoxy Coating, 2 or 3</td>
<td>Blome International,</td>
<td>For secondary containment structures, concrete floors, and other applications.</td>
<td>36 hr cure before service</td>
<td>30-45 min/12 months</td>
<td>Chemical and water resistant, good flexibility.</td>
<td>12 months</td>
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</tr>
<tr>
<td>EC-80, High Performance Epoxy Coating, 2 or 3</td>
<td>Blome International,</td>
<td>For secondary containment structures, concrete floors, and other applications.</td>
<td>12 months</td>
<td>25-35 min/12 months</td>
<td>Chemical resistant, and durable. Can be reinforced to have high impact and thermal shock resistance.</td>
<td>12 months</td>
<td></td>
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</tr>
<tr>
<td>EC-R540, Moisture Tolerant Epoxy System, 2</td>
<td>Blome International,</td>
<td>For brick and tile mortar, coating damp floor surfaces, concrete surfaces, lining below grade concrete pits, manholes and wet wells, under water repair.</td>
<td>30-40 min/12 months</td>
<td>20-30 min/12 months</td>
<td>Moisture tolerant epoxy system, two component epoxy system that has a high degree of moisture tolerance. Increased crack and impact resistance.</td>
<td>12 months</td>
<td></td>
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</tr>
<tr>
<td>EC-R590, Multi-Purpose Epoxy System, 2</td>
<td>Blome International,</td>
<td>For floor toppings, casting of equipment footings, concrete surfaces, lining below grade concrete pits, manholes and wet wells.</td>
<td>36 months</td>
<td>24-30 min/12 months</td>
<td>Exhibits crack and impact resistance.</td>
<td>12 months</td>
<td></td>
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</tr>
<tr>
<td>Carboguard 554 High Solids Epoxy, 2</td>
<td>Carboline,</td>
<td>Hard, tile-like finish for institutional and industrial steel, concrete, drywall and plaster</td>
<td>8 hr recoat</td>
<td>45 min/12 months</td>
<td>Superior abrasion resistance, excellent resistance to aerated seawater and other chemicals, excellent immersion performance</td>
<td>12 months</td>
<td></td>
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</tr>
<tr>
<td>Carboguard 1207 Polyamido-Amine Epoxy, 2</td>
<td>Carboline,</td>
<td>Steel and concrete surfaces</td>
<td>16 hr recoat</td>
<td>3 yrs</td>
<td>Excellent abrasion and chemical resistance, outstanding impermeability, single coat, self-priming capabilities, VOC compliant.</td>
<td>12 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carboguard 1209, Polyamido-Amine Epoxy, 2</td>
<td>Carboline,</td>
<td>Dense, highly impermeable glass flake filled coating used for protecting steel and concrete for marine, offshore, petrochemical, pulp &amp; paper and other aggressive environments.</td>
<td>8 hr recoat</td>
<td>2 hr/36 months</td>
<td>Excellent abrasion and chemical resistance, outstanding impermeability, single coat, self-priming capabilities, VOC compliant.</td>
<td>12 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Company</td>
<td>Product Description</td>
<td>Application</td>
<td>Performance</td>
<td>Dry Time</td>
<td>Lead Time</td>
<td>Notes</td>
<td></td>
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<tr>
<td>Carboline</td>
<td>Carboguard 1340 Polyamido-Amine Epoxy, 2</td>
<td>Concrete</td>
<td>Flexible, retards the escape of moisture from green concrete</td>
<td>12 hr</td>
<td>14 day</td>
<td>6 day</td>
<td></td>
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<td></td>
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<td></td>
<td>Excellent corrosion protection, good resistance to salting; fast cure</td>
<td>30 min</td>
<td>18 hr</td>
<td>3 yrs</td>
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<tr>
<td></td>
<td>Carbozinc 11 WB Inorganic Zinc Primer</td>
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<tr>
<td></td>
<td>Carboline, Plastic 4310 Vinyl Ester Resin with Flake Pigment, 3</td>
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<tr>
<td></td>
<td>Carboline, Polbraid 705, Aromatic Polyurethane, 2</td>
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<tr>
<td></td>
<td>Carboline, Rustbond &amp; Rustbond FC, Polymeric Epoxy Amine, 2</td>
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<td>Carboline, Sanitile 755, Ultra-Durable Epoxy Wall Cladding, 2</td>
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<td>Carboline, Sanitile 945 High Build Epoxy Coating, 2</td>
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<td>Carboline, Sanitile 925 Cross-linked Epoxy, 2</td>
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<tr>
<td></td>
<td>ChemMasters, Aquanil, Silicone Moisture Barrier, Penetrating and Clear</td>
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<td></td>
<td>ChemMasters, Chemisol, WB Clear liquid Sodium Silicate Hardner</td>
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<td></td>
<td>ChemMasters, Chemisol Plus, Chemically Reactive Liquid Hardener</td>
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<td>ChemMasters, Duraflow 150, Self-Leveling Epoxy, 2</td>
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<td></td>
<td>ChemMasters, Duraflow 250, Self-Leveling Epoxy Novalac, 2</td>
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<td>ChemMasters, Duraflow 450, Self-Leveling Methyl Methacrylate</td>
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<td>ChemMasters, Duraguard 100, Epoxy, 2</td>
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<tr>
<td>Company, Product</td>
<td>Type</td>
<td>0</td>
<td>100</td>
<td>80-110</td>
<td>Description</td>
<td>Properties</td>
<td>Tack Free</td>
<td>recoat durability</td>
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<tr>
<td>ChemMasters, Duraguard 120, Epoxy</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>For areas subject to moderate wear, chemical attack</td>
<td>High build, withstands extreme temperatures, color fast, high gloss, resistant to most acids, alkalis, solvents, gasoline and aviation fuels, moderate resistance to chemical spills, fumes or immersion, oils, grease.</td>
<td>8 hr tack free</td>
<td>30 min/1yr</td>
<td></td>
</tr>
<tr>
<td>ChemMasters, Duraguard 220, Epoxy Novalac</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>Uses include concrete floors subjected to chemical spills, industrial, commercial, manufacturing, petrochemical operations, chemical storage and warehouse facilities, hospitals.</td>
<td>Chemical resistant, high gloss, superior resistance to hydrocarbons, animal, mineral and vegetable oils.</td>
<td>8 hr recoat</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>ChemMasters, Duraguard 400, Methyl Methacrylate</td>
<td>P</td>
<td>0</td>
<td>100</td>
<td>Used on interior or exterior, horizontal or vertical, concrete or wood.</td>
<td>Cures rapidly, superior adhesion, may be applied at low temperatures, exceptional flexibility and shear stresses.</td>
<td>1-2 hr recoat</td>
<td>20-40 min/1yr</td>
<td></td>
</tr>
<tr>
<td>ChemMasters, Duraguard 401, High Molecular Weight Methacrylate, Solvent Free</td>
<td>S</td>
<td>0</td>
<td>100</td>
<td>Used to provide long term protection for concrete surfaces against water and chloride penetration.</td>
<td>Low viscosity for deep penetration, wide temperature range, excellent impact abrasion and chemical resistance, withstands full immersion in liquid chemicals and water, low odor.</td>
<td>2 hr cure</td>
<td>40-50 min/1yr</td>
<td></td>
</tr>
<tr>
<td>ChemMasters, Duraguard 420, High Build Methyl Methacrylate</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>Used on interior, horizontal concrete surfaces, industrial, commercial and warehousing applications, manufacturing and assembly plants, loading docks.</td>
<td>Rapid curing and recoat, excellent resistance to alcohols, petroleum products and aromatic solvents.</td>
<td>20-90 min cure</td>
<td>10-40 min/1yr</td>
<td></td>
</tr>
<tr>
<td>ChemMasters, Duraguard 520/530, High Performance Vinyl Ester</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>Used for interior or exterior, horizontal or vertical, concrete or steel surfaces, industrial, commercial and warehousing applications, primary or secondary containment dikes and tanks.</td>
<td>Chemical, abrasion and impact resistant and high durability, excellent flexibility &amp; tensile strength, withstands immersion, fumes and spillage of solvents, caustics and organics</td>
<td>4-5 hr tack free</td>
<td>48 hr recoat</td>
<td></td>
</tr>
<tr>
<td>ChemMasters, Safe-Cure &amp; Seal EPX, Clear Epoxy</td>
<td>P/S/T</td>
<td>24</td>
<td>31</td>
<td>Suitable for use as an epoxy primer or coating for interior/exterior cured concrete.</td>
<td>Excellent resistance to chloride ion penetration, has high level of moisture vapor transmission, improved wear and chemical resistance.</td>
<td>6-8 hr touch</td>
<td>24-72 hr recoat</td>
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<tr>
<td>Cloverdale Paint, 70329 Ecologic Rustex WB Acrylic Primer</td>
<td>P</td>
<td>99</td>
<td>40</td>
<td>General purpose direct-to-metal primer for properly prepared ferrous and non-ferrous metals at industrial, commercial and/or institutional applications</td>
<td>Good corrosion resistance, re-coat tolerant, adhesion to wide range of substrates</td>
<td>15 min touch</td>
<td>2 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Cloverdale Paint, 752 Advantage Polymer Epoxy Coating</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>Commercial/Industrial flooring applications: hospitals, manufacturing, garage floors, schools, penal institutions, bathrooms and locker rooms, animal shelters</td>
<td>Excellent abrasion and chemicals resistance</td>
<td>9 hr recoat</td>
<td>25 min gel/1yr</td>
<td></td>
</tr>
<tr>
<td>Cloverdale Paint, 83020 PrepTech Epoxy Sealer</td>
<td>S</td>
<td>0</td>
<td>100</td>
<td>Over aged coatings, concrete, rusty steel, hand or power tool cleaned steel to promote adhesion of subsequent coatings</td>
<td>Enhanced adhesion and durability, excellent weather, solvent, saltwater, abrasion, alkali and oil resistance</td>
<td>8 hr touch</td>
<td>1 hr/ N/A</td>
<td></td>
</tr>
<tr>
<td>Color Wheel Paints &amp; Coatings, 1635 Aquatic Industrial Acrylic Primer</td>
<td>P</td>
<td>87</td>
<td>44</td>
<td>Structural steel, aluminum, galvanized metals, ferrous metals, copper, stainless steel, fiberglass, polystyrene</td>
<td>Chemical resistant, corrosion resistant, fast drying, early moisture resistant, early rust resistant</td>
<td>30 min touch</td>
<td>2 hr recoat</td>
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</tr>
<tr>
<td>Deft Inc, 09GY007E SB Polyurethane</td>
<td>P</td>
<td>0</td>
<td>48</td>
<td>Steel and aluminum</td>
<td>Solvent borne, lead and chromate free, contains exempt solvents, passes lifting, adhesion, flexibility, water resistance and fluid resistance tests</td>
<td>6 hr sand</td>
<td>2 hr/ 1yr</td>
<td></td>
</tr>
<tr>
<td>Deft Inc, 36W021E/ECAT Gloss White</td>
<td>T</td>
<td>0</td>
<td>48</td>
<td>Over primed steel and aluminum</td>
<td>Passes fluid resistance both spot test and immersion test, salt spray resistance, accelerated weathering</td>
<td>15 min recoat</td>
<td>4 hr/ 2yrs</td>
<td></td>
</tr>
<tr>
<td>Company</td>
<td>Product Name</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>150-175</td>
<td>Recommended applications include food processing floors, laboratories, pharmaceutical plants, waste water treatment facilities.</td>
<td>Semi-self leveling, stain and chemical resistant.</td>
<td>24 hr full cure</td>
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<tr>
<td>Dudick, Inc.</td>
<td>Polymer Alloy 1000/1000SF, Epoxy</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>150-175</td>
<td>Recommended applications include food processing floors, laboratories, pharmaceutical plants, waste water treatment facilities.</td>
<td>Semi-self leveling, stain and chemical resistant.</td>
<td>24 hr full cure</td>
</tr>
<tr>
<td>Dudick, Inc.</td>
<td>Polymer Alloy 2000/2000SF, Epoxy</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>150-175</td>
<td>Recommended applications include food processing floors, laboratories, pharmaceutical plants, waste water treatment facilities.</td>
<td>Semi-self leveling, stain and chemical resistant.</td>
<td>24 hr full cure</td>
</tr>
<tr>
<td>Dudick, Inc.</td>
<td>Protecto-Coat 100 XT, Novolac Epoxy</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
<td>38-40@ 40 mls</td>
<td>Recommended applications include secondary containment, structural steel, floors (spillage), storage tanks, pump housings.</td>
<td>Flake filled, high performance, low odor, environmentally safe, chemical resistance</td>
<td>6-8 hr recoat</td>
</tr>
<tr>
<td>Dupont,</td>
<td>Corlar LV Semi-gloss Epoxy Mastic</td>
<td>P/T</td>
<td>85</td>
<td>90</td>
<td>288@5 mils</td>
<td>General metal finish for harsh chemical environments</td>
<td>Should be topcoated for exterior exposure, chemical resistant, corrosion resistant</td>
<td>3-4 hr touch</td>
</tr>
<tr>
<td>Dupont,</td>
<td>Imron 230-ZV High-gloss WB Polyurethane</td>
<td>T</td>
<td>0</td>
<td>77</td>
<td>617@2 mls</td>
<td>General metal finish for harsh chemical environments</td>
<td>Chemical and abrasion resistant, flexible</td>
<td>N/A</td>
</tr>
<tr>
<td>Duromar,</td>
<td>1110 High Performance Lining, Epoxy, with a modified alkyl-amine hardener</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
<td>40@40 mls</td>
<td>Oil and other storage tanks</td>
<td>Good chemical resistance to dilute and mild inorganic acids as well as water, seawater and de-mineralized water, flexible, high gloss</td>
<td>6 hr tack free</td>
</tr>
<tr>
<td>Duromar,</td>
<td>1301 High Performance Lining, Epoxy with a modified aliphatic/cycloaliphatic amine hardener</td>
<td>S/T</td>
<td>0</td>
<td>100</td>
<td>160-200</td>
<td>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</td>
<td>Moderate chemical and abrasion resistance</td>
<td>8 hr tack free</td>
</tr>
<tr>
<td>Duromar,</td>
<td>4300 Series High Performance Lining, Epoxy with modified cycloaliphatic amine hardener</td>
<td>P</td>
<td>0</td>
<td>100</td>
<td>40@40 mls</td>
<td>Boiler skirts, incinerator outlets, power plant outlet ducts, utility FGD systems, retrofit chemical and acid storage tanks</td>
<td>Outstanding chemical resistance, used in areas requiring temperature and abrasion resistance</td>
<td>3-8 hr tack free</td>
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<tr>
<td>Duromar,</td>
<td>1510 High Performance Lining, Epoxy with a modified amido-amine hardener</td>
<td>P</td>
<td>0</td>
<td>100</td>
<td>320@5 mls</td>
<td>A low viscosity holding primer for steel surfaces allowing for extremely long overcoat windows</td>
<td>Moderate abrasion and corrosion resistance,</td>
<td>6-8 hr tack free</td>
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<tr>
<td>Duromar,</td>
<td>2131, 2132, 2134 High Performance Lining, Epoxy with a modified polyamide hardener</td>
<td>P</td>
<td>0</td>
<td>100</td>
<td>40@40 mls</td>
<td>Tank linings, for circulating water systems, repair of old tanks</td>
<td>Outstanding abrasion resistance, chemical resistant, unparalleled resistance to mechanical damage, high build upto 250 mls</td>
<td>6-8 hr tack free</td>
</tr>
<tr>
<td>Duromar,</td>
<td>2201 High Performance Lining, Epoxy with modified aliphatic/cycloaliphatic amine hardener</td>
<td>P</td>
<td>0</td>
<td>100</td>
<td>40@40 mls</td>
<td>Process vessels, baghouse or precipitator walls, coal bunkers, flooring</td>
<td>Fast curing, outstanding abrasion and chemical resistance</td>
<td>3 hr tack free</td>
</tr>
<tr>
<td>Duromar,</td>
<td>2221 High Performance Lining, Epoxy with modified aliphatic/cycloaliphatic amine hardener</td>
<td>P</td>
<td>0</td>
<td>100</td>
<td>40@40 mls</td>
<td>Rail cars, ash hoppers, slurry tanks, secondary containment, traveling water screens</td>
<td>Flexible, abrasion and chemical resistance</td>
<td>3 hr tack free</td>
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<tr>
<td>Product Name</td>
<td>Viscosity</td>
<td>Solid Content</td>
<td>Application</td>
<td>Properties</td>
<td>Drying Time</td>
<td>Notes</td>
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<td>Duromar, 2310, 2510, 2510-UW High Performance Lining</td>
<td>0</td>
<td>100</td>
<td>40@40 mils</td>
<td>Tank linings, floors and secondary containment, 2510 UW for under water or extremely damp applications such as dams, sewage treatment systems, process water tanks</td>
<td>Excellent chemical resistance and ease of workability</td>
<td>8-12 hr tack free 6-120 hr recoat 40-60 min/12 months</td>
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<tr>
<td>Duromar, 3320 High Performance Lining</td>
<td>0</td>
<td>100</td>
<td>40@40 mils</td>
<td>Flooring and secondary containment</td>
<td>Outstanding chemical resistance to sulfuric and other inorganic acids, good abrasion resistance, excellent adhesion</td>
<td>6-48 hr recoat 42 hr cure 45 min/12 months</td>
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<tr>
<td>Duromar, 6310 High Performance Lining</td>
<td>0</td>
<td>100</td>
<td>160-200</td>
<td>Clear topcoat that can be used on all properly prepared substrates for UV protection</td>
<td>Outstanding color stability and UV resistance, moderate chemical and abrasion resistance</td>
<td>5 hr tack free 4-72 hr recoat 40 min/12 months</td>
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<td>Duromar, HydroFlor DuroFlor Lining</td>
<td>0</td>
<td>100</td>
<td>50@30 mils</td>
<td>Concrete floors</td>
<td>Breathable, excellent adhesion to smooth, damp, poorly prepared concrete, outstanding resistance to mechanical abuse</td>
<td>6 hr tack free 6-96 hr recoat 7 day cure 45 min/12 months</td>
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<tr>
<td>Enviroline, 376F-30 Tank and Pipelining Hybrid Epoxy</td>
<td>0</td>
<td>100</td>
<td>80@20 mils</td>
<td>Petroleum Industry such as bulk storage tank linings, floors, tank pads, trenches, interior/exterior pipes, troughs, sumps</td>
<td>Excellent adhesion, superior abrasion resistance, impact resistance, cathodic disbondment resistance, resists chemicals and solvents, high temp stability, fast cure</td>
<td>2 hr touch 2½-4 hr recoat 11 hr cure 30 min/2 yrs</td>
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<tr>
<td>Enviroline, 393-PM Low Temp Cure Epoxy Topcoat</td>
<td>0</td>
<td>100</td>
<td>80@20 mils</td>
<td>Steel storage tank interiors, floors and secondary containment areas in low temperature application</td>
<td>Excellent gloss retention, flexible, excellent adhesion, corrosion, abrasion and stain resistance, fast curing</td>
<td>15 min touch 1 hr handle 4-20 hr recoat 15 min/2 yrs</td>
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<tr>
<td>Enviroline, 399-30 Tank and Pipelining Hybrid Epoxy</td>
<td>0</td>
<td>100</td>
<td>80@20 mils</td>
<td>Petroleum Industry such as bulk storage tank linings, floors, tank pads, trenches, interior/exterior pipes, troughs, sumps</td>
<td>Excellent adhesion, superior abrasion resistance, impact resistance, cathodic disbondment resistance, resists chemicals and solvents, high temp stability, fast cure</td>
<td>2 hr touch 2½-4 hr recoat 11 hr cure 30 min/2 yrs</td>
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<tr>
<td>Enviroline, 125LV Epoxy Lining</td>
<td>48</td>
<td>96</td>
<td>77@20 mils</td>
<td>Internal lining for steel and concrete storage tanks, secondary containment and exterior buried pipe</td>
<td>Gasoline and gasohol resistance, excellent adhesion, impact and abrasion resistance</td>
<td>2-4 hr touch 3 hr recoat 24 hr cure 41 min/2 yrs</td>
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<tr>
<td>Enviroline, 125U Third-Party Certified UST Lining</td>
<td>13</td>
<td>100</td>
<td>16@100 mils</td>
<td>Internal lining for steel, fiberglass and concrete underground storage tanks, secondary containment</td>
<td>Gasoline and gasohol resistance, excellent adhesion, 100% methanol and ethanol resistance, fast cure</td>
<td>2-4 hr touch 3 hr recoat 10-12 hr cure 10 min/2 yrs</td>
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<tr>
<td>Enviroline, 150 Solvent Resistant Novolac Epoxy Lining</td>
<td>0</td>
<td>100</td>
<td>40@40 mils</td>
<td>Steel and concrete storage tanks, floors, and containment vessels containing acid, alkali, solvents, and corrosive salts</td>
<td>Resists aggressive solvents, excellent adhesion, abrasion and impact resistance, fast cure</td>
<td>2 hr touch 2-4 hr recoat 8 hr cure 5 min/2 yrs</td>
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<tr>
<td>Enviroline, 222 Moisture Tolerant Epoxy Novalac Lining</td>
<td>0</td>
<td>100</td>
<td>80@20 mils</td>
<td>Sewer manholes, concrete sewage pipes, lift stations, wet wells, concrete pipes, other subgrade structures</td>
<td>Superior chemical resistance, excellent adhesion to concrete, abrasion and impact resistance, fast cure</td>
<td>1 hr touch 2 hr recoat 8 hr cure 15 min/2 yrs</td>
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<tr>
<td>Enviroline, 224 Wastewater Epoxy Novalac Lining</td>
<td>0</td>
<td>100</td>
<td>80@20 mils</td>
<td>Waster water treatment application</td>
<td>Superior chemical resistance, excellent adhesion to concrete, abrasion and impact resistance, fast cure</td>
<td>50 min touch 1½-4 hr recoat 10 hr cure 20 min/2 yrs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enviroline, 225 Acid Resistant Hybrid Novolac Epoxy Lining</td>
<td>0</td>
<td>100</td>
<td>40@40 mils</td>
<td>Steel and concrete storage tanks, floors and containment areas containing acids, alkalis, solvents, and corrosive salts</td>
<td>Acid resistant, excellent adhesion, thermal &amp; mechanical shock resistance, fast cure</td>
<td>45 min touch 45 min recoat 6-8 hr cure 11 min/2 yrs</td>
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## Rule 1113 Future Compliant Coatings
### 2004-2005 Technology Assessment
#### December 2005

<p>| Enviroline, 230 Potable Water Epoxy Novolac Lining, 2 | P/T | 16 | 100 | 80@20 mls | 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 mls | 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 mls | 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 | 4-12 hr recoat | 12 hr cure | 13 min/ 2 yrs |
| Enviroline, 290 Organic Acid Epoxy Phenolic Lining, 2 | P/T | 34 | 100 | 53@30 mls | Steel Storage tanks containing acids, alkalis and corrosive salts, food and beverage tanks, immersion application | Chemical resistance, excellent adhesion, abrasion and impact resistance, high temperature stability, fast cure, 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 mls | 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 mls | 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, 399 Abrasion Resistant Epoxy Coating, 2 | P/T | 0 | 100 | 80@20 mls | 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, wet 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 touch | 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), Eucroxy Tufcoat HB+, 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 |
| Euronavy, Euro-Basic ES301, Modified Epoxy/Amine | P/I/T | 0 | 100 | 225-325 | Recommended uses include pipe coatings, ships, offshore &amp; marine structures, structural steel &amp; 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 |</p>
<table>
<thead>
<tr>
<th>Company</th>
<th>Product Description</th>
<th>Application</th>
<th>Viscosity (cP)</th>
<th>Physical Properties</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Euronavy, Euro-Basic ES301FT, Modified Epoxy/Amine</td>
<td>For highly corroded horizontal surfaces. Recommended uses include pipe coatings, structural steel &amp; equipment, ships, offshore &amp; marine structures.</td>
<td>P</td>
<td>0</td>
<td>100</td>
<td>For concrete surfaces such as sea walls, pools, aquariums, dams, floor, aqueducts, tanks, tunnels</td>
</tr>
<tr>
<td>Euronavy, Euro-Basic ES301S, Modified Epoxy/Amine</td>
<td>Intermediate solvent free epoxy with high edge retention ability. No harmful solvent vapors, no VOC's.</td>
<td>I</td>
<td>0</td>
<td>100</td>
<td>High abrasion resistance. No harmful vapors, no VOC's, superior impact resistance, non-flammable, good chemical resistance, fast drying.</td>
</tr>
<tr>
<td>Euronavy, Euro-Floor ES302H, Epoxy</td>
<td>For concrete floors on steel or concrete such as industrial, anti-skid, food industry, warehouses, decks. Also applicable as concrete primer.</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>Excellent mechanical resistance. Flexible epoxy self-leveling, no harmful solvent vapors, no VOC's, superior elasticity, non-flammable, good chemical, solvent and water immersion resistance.</td>
</tr>
<tr>
<td>Euronavy, Euro-Steel BE23, Modified Epoxy/Amine</td>
<td>Solvent free epoxy resin, no harmful solvent vapors, no VOC's, superior impact resistance.</td>
<td>P</td>
<td>0</td>
<td>100</td>
<td>Solvent free, tolerant to humid surfaces. Certified for potable water contact. No VOC's, non-flammable, good chemical resistance.</td>
</tr>
<tr>
<td>Euronavy, Euro-Wet BE14</td>
<td>For containment, encapsulation and most substrates</td>
<td>P/I</td>
<td>0</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Florock Seamless Systems, System 4700 High Speed Epoxy</td>
<td>Floor resurfacer, ideal for use over existing coatings that are well-bonded and properly prepared.</td>
<td>I/T</td>
<td>0</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>FMi Paint and Stain Corp, 402 Series Galvabond 100% Acrylic Industrial Coating</td>
<td>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</td>
<td>P/T</td>
<td>52</td>
<td>35</td>
<td>200</td>
</tr>
<tr>
<td>Freecom Inc, CeRam-Floor Primer</td>
<td>Seal coat for concrete</td>
<td>P</td>
<td>0</td>
<td>100</td>
<td>8000@2 mils</td>
</tr>
<tr>
<td>Freecom Inc, CeRam-Floor Self-Leveling Ceramic Slurry</td>
<td>Concrete floors in packaging and storage areas, locker and restrooms, clean rooms, animal care, forklift areas, loading docks</td>
<td>I/T</td>
<td>0</td>
<td>100</td>
<td>40@40 mils</td>
</tr>
<tr>
<td>Freecom Inc, CeRam-Floor Trowelable Resurfacing Material</td>
<td>Resurfacing old concrete floors, heavy impact areas, leading docks, forklift areas</td>
<td>I/T</td>
<td>0</td>
<td>100</td>
<td>13@125 mils</td>
</tr>
<tr>
<td>Freecom Inc, Ceram-Kote 2000, Ceramic Novalac Epoxy</td>
<td>All metals, fiberglass reinforced plastics, concrete for environments such as internal tanks, harsh chemicals, clarifiers, fuel tanks, petrochemical facilities, wastewater treatment</td>
<td>T</td>
<td>89</td>
<td>83</td>
<td>N/A</td>
</tr>
<tr>
<td>Freecom Inc, Ceram-Kote SPG22, Ceramic Novalac Epoxy</td>
<td>Tanks and processing vessels, pipeline protection, dredge Equipment, pump impellers, cooling towers, secondary containment, ship decks, tile sealer, concrete walls and floors</td>
<td>I/T</td>
<td>0</td>
<td>100</td>
<td>53@30 mils</td>
</tr>
<tr>
<td>Company</td>
<td>Type</td>
<td>polymers</td>
<td>Pounds</td>
<td>Solids</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>------------</td>
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<td>--------</td>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Gaco Western Inc, GacoFlex E-5220 WB Epoxy, 2</td>
<td>P</td>
<td>99</td>
<td>44</td>
<td>70-250</td>
<td>Metals, organic polymers, wood, masonry, vitreous surfaces, approved for meat and poultry processing buildings</td>
</tr>
<tr>
<td>Gaco Western Inc, GacoFlex E-5481 Epoxy</td>
<td>P</td>
<td>0</td>
<td>100</td>
<td>100-200</td>
<td>For concrete surfaces, adheres well to most metals, organic polymers, wood, masonry and vitreous surfaces</td>
</tr>
<tr>
<td>Gaco Western Inc, GacoFlex LM-60 Liquid-Applied Urethane, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>1600 per mil</td>
<td>High-build waterproofing membrane over concrete, metal, plywood. To line potable water storage tanks and water treatment facilities</td>
</tr>
<tr>
<td>Gaco Western Inc, GacoFlex E-5320 WB Epoxy</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>1600 per mil</td>
<td>Lining steel, masonry or wood tanks, silos, pipes, flumes.</td>
</tr>
<tr>
<td>Gaco Western Inc, GacoFlex U-62 Urethane, 2</td>
<td>I/T</td>
<td>0</td>
<td>100</td>
<td>1600 per mil</td>
<td>High-build base and finish for mechanical room floors, walking decks and vehicular traffic decks on floors of plywood, concrete and metal</td>
</tr>
<tr>
<td>Gaco Western Inc, GacoSil S-13 Water-Based Clear Elastomeric Silicone</td>
<td>T</td>
<td>0</td>
<td>18</td>
<td>287 per mil</td>
<td>Protective coating and membrane for exterior applications are areas where solvent based coatings are not desirable or could be hazardous</td>
</tr>
<tr>
<td>Global Eco Technologies Inc, 1988 Endura-Flex Elastomeric Polyurethane</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
<td>1604 per mil</td>
<td>Use in gaseous or liquid phase exposures found in water and wastewater vessels both steel and concrete</td>
</tr>
<tr>
<td>Global Eco Technologies Inc, 1990 Endura-Flex Elastomeric Polyurethane, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>1604 per mil</td>
<td>Concrete, asphalt, steel, wood and earthen substrates for secondary containment, petroleum and water treatment</td>
</tr>
<tr>
<td>Global Eco Technologies Inc, Endura-Flex RBU Polyurethane</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
<td>1604 per mil</td>
<td>Long term protection of buried/immersed interior/exterior steel or concrete pipe</td>
</tr>
<tr>
<td>Global EcoTechnologies Inc, 1200 P Endura-Flex Epoxy Primer Sealer, 2</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
<td>1604 per mil</td>
<td>Steel and porous substrates exposed to the chemical and physical environments in water and wastewater treatment</td>
</tr>
<tr>
<td>Global EcoTechnologies Inc, 550 Endura-Flex Primer/Sealer, Pre-Reacted Polyurethane Emulsion</td>
<td>E</td>
<td>0</td>
<td>45</td>
<td>540 per mil</td>
<td>Porous substrates such as concrete, asphalt, and wood for secondary containment in intermittent immersion, splash and spill situations</td>
</tr>
<tr>
<td>ICI Paints (Devoc), 305 Catha-Coat WB Inorganic Zinc Coating</td>
<td>P/T</td>
<td>0</td>
<td>61</td>
<td>978 per mil</td>
<td>Steel structures, tanks, equipment, piping in refineries, chemical process plants, chemical storage tanks and pulp and paper mills</td>
</tr>
<tr>
<td>ICI Paints (Devoc), 525 DEVFLOOR Epoxy Resurfacer 2</td>
<td>P/I</td>
<td>10</td>
<td>100</td>
<td>107-321</td>
<td>Concrete floors</td>
</tr>
<tr>
<td>ICI Paints (Devoc), 569 DEVFLOOR WB Urethane 2</td>
<td>T</td>
<td>20</td>
<td>48</td>
<td>320-400</td>
<td>Concrete floors</td>
</tr>
<tr>
<td>Ins-X Superior Coating Systems, EP-5200 100% Solids Epoxy Coating, 2</td>
<td>X</td>
<td>0</td>
<td>100</td>
<td>1604 per mil</td>
<td>Concrete floors exposed to heavy traffic, or severe chemicals</td>
</tr>
<tr>
<td>International Protective Coatings, Intergard 270 Waterborne Epoxy</td>
<td>X</td>
<td>47</td>
<td>50</td>
<td>267</td>
<td>Non-immersed steel surfaces at petrochemical plants, pulp and paper mills, power stations, bridges and offshore structures</td>
</tr>
<tr>
<td>ITW Devcon Futura Coatings, Protec II, Fast Set Urethane,</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
<td>1604 per mil</td>
<td>For steel and ductile iron pipelines, sheet piling and many other metal substrates.</td>
</tr>
<tr>
<td>ITW Resin Technologies, IMPAX 350 Rapid-Cure Epoxy Anti Slip</td>
<td>I</td>
<td>90</td>
<td>90</td>
<td>30-60</td>
<td>Deck coating in slippery areas in marine and industrial environments on concrete, steel, wood and previously painted surfaces</td>
</tr>
<tr>
<td>ITW Resin Technologies, IMPAX 700 High Solids W/B Epoxy,</td>
<td>I</td>
<td>25</td>
<td>96</td>
<td>200</td>
<td>Moderate to high traffic conditions and moderate chemical exposure on concrete, wood and previously painted surfaces</td>
</tr>
<tr>
<td>ITW Resin Technologies, IMPAX HPU 100 Urethane,</td>
<td>I</td>
<td>0</td>
<td>100</td>
<td>150-250</td>
<td>Aircraft hangars and other difficult environments on concrete, steel, wood and previously painted surfaces</td>
</tr>
<tr>
<td>JFB Hart Coatings, HP-105, Aliphatic Polyurethane, Clear/Pigmented High Gloss,</td>
<td>T</td>
<td>0-10</td>
<td>53-63</td>
<td>250-650</td>
<td>Steel, Aluminum, galvanized metals, previously painted surfaces for exterior tanks, structural steel, chemical plants, refineries, floor coating systems</td>
</tr>
<tr>
<td>JFB Hart Coatings, HP-330 High Solids Epoxy, High Gloss</td>
<td>I/T</td>
<td>0</td>
<td>90</td>
<td>100-150</td>
<td>Floor applications over concrete for interior application, can be used as an exterior primer with topcoat, Steel, aluminum, galvanized metal, previously painted surfaces</td>
</tr>
<tr>
<td>KCC Coatings, AEP 18 AR TECHNI-PLUS,</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
<td>107</td>
<td>For use as an erosion and abrasion coating immersion system on steel or other metallic surfaces.</td>
</tr>
<tr>
<td>KCC Coatings, AEP 20 TECHNI-PLUS,</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
<td>80</td>
<td>For use as an immersion lining system, a light to moderate traffic flooring system &amp; corrosion resistant coating on concrete or steel.</td>
</tr>
<tr>
<td>KCC Coatings, AEP 25.3 AR TECHNI-PLUS,</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
<td>64</td>
<td>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</td>
</tr>
<tr>
<td>KCC Coatings, EN 25.6 TECHNI-PLUS,</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
<td>64</td>
<td>For use in railcars, tank trucks as well as process vessels or any steel or aluminum substrate subject to bending stresses and movement.</td>
</tr>
<tr>
<td>KCC Coatings, 3100 CL Thermocoat</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>Industrial atmospheric maintenance coating for steel and concrete surfaces as well as over old coatings.</td>
<td>High performance thermoplastic system, tough and flexible, corrosion &amp; abrasion resistant with exceptional molecular permeation resistance along with UV and weathering resistance.</td>
</tr>
<tr>
<td>Key Resin Company, 420 Key Polyurethane Coating,</td>
<td>T</td>
<td>25</td>
<td>100</td>
<td>160</td>
<td>Floor coating designed to provide high gloss, UV stable, chemical resistant protection, clear or pigmented. Low odor for use in occupied areas, chemical &amp; stain resistant, easy application, UV stable.</td>
</tr>
<tr>
<td>Key Resin Company, 440 Key Aliphatic Urethane Sealer, 1</td>
<td>S</td>
<td>27</td>
<td>27</td>
<td>300</td>
<td>For sealing concrete and stained concrete surfaces. Easy application with excellent handling characteristics, excellent abrasion &amp; chemical resistance, low odor for use in occupied areas, low maintenance finish, excellent clarity &amp; color retention.</td>
</tr>
<tr>
<td>Key Resin Company, 502 Key Primer, Epoxy 2</td>
<td>P</td>
<td>0</td>
<td>100</td>
<td>250-275</td>
<td>Moisture tolerant for concrete, wood, and masonry surfaces. Stress relieving, moisture insensitive cure, low viscosity-good wetting properties.</td>
</tr>
<tr>
<td>Key Resin Company, 520 100% Solids Epoxy Coating, 2</td>
<td>I</td>
<td>0</td>
<td>100</td>
<td>160</td>
<td>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 &amp; stain resistant, easy application, provides a smooth, high gloss finish.</td>
</tr>
<tr>
<td>Key Resin Company, 532 Water Emulsion Epoxy Primer, 2</td>
<td>P/S</td>
<td>&lt;60</td>
<td>38-40</td>
<td>250-275</td>
<td>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.</td>
</tr>
<tr>
<td>Key Resin Company, 535 Water Emulsion Epoxy Finish, 2</td>
<td>T</td>
<td>&lt;60</td>
<td>40-45</td>
<td>275-300</td>
<td>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.</td>
</tr>
<tr>
<td>Key Resin Company, 544 Key Epoxy Wall Coating</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
<td>160</td>
<td>For wall and containment applications. Low odor application and cure, chemical &amp; stain resistance, bonds well to cool, damp substrates.</td>
</tr>
<tr>
<td>Key Resin Company, 625 Key Epoxy Novolac Coating, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>100</td>
<td>Floor coating available in multiple colors. Superior chemical &amp; 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.</td>
</tr>
<tr>
<td>Key Resin Company, 633 Key Novolac Epoxy Coating, 2</td>
<td>S</td>
<td>0</td>
<td>100</td>
<td>160</td>
<td>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.</td>
</tr>
<tr>
<td>Key Resin Company, 644 Key Chemical Resistant Epoxy Wall Coating, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>160</td>
<td>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.</td>
</tr>
<tr>
<td>Kryton Epox-9, K450, Epoxy Coating, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>400</td>
<td>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 &amp; chemical resistant, resistant to chlorine and bromine, graffiti resistant, easily cleaned, superior abrasion resistant, wide variety of colors available.</td>
</tr>
<tr>
<td>Manufacturing &amp; Consulting Chemists Inc, 467 Series WB Acrylic Industrial Coatings</td>
<td>T</td>
<td>100</td>
<td>30-33</td>
<td>N/A</td>
<td>Steel, aluminium, galvanized surfaces, plastic and glass</td>
</tr>
<tr>
<td>Monopole Inc, 1100, 1150 Monochem 1, 2</td>
<td>P/S</td>
<td>0</td>
<td>N/A</td>
<td>250-300</td>
<td>Used in the Monochem Decking System, wood, metal, excellent sealer for concrete floors in warehouses and factories</td>
</tr>
<tr>
<td>Monopole Inc, 5350, 5355 Monochem Permsheild 200, 2</td>
<td>T</td>
<td>&lt;70</td>
<td>N/A</td>
<td>200</td>
<td>Interior/exterior for concrete, masonry, wood, aluminum and metal in office buildings, pharmaceutical, medical and food facilities</td>
</tr>
<tr>
<td>Product Name</td>
<td>S/T</td>
<td>0</td>
<td>100</td>
<td>160</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------</td>
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<tr>
<td>Novocoat Protective Coatings, ER-1500 NovoFlex, Epoxy Amine, 2</td>
<td></td>
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<td></td>
<td></td>
<td>For metal and concrete substrates. Can be applied to asphalt secondary containment structures. For cooling Towers, floors, walls, foundations, vaults, bunkers.</td>
</tr>
<tr>
<td>Novocoat Protective Coatings, ER-2000 NovoFlex, Epoxy Amine, 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>For metal and concrete substrates including both asphalt and concrete secondary containment structures.</td>
</tr>
<tr>
<td>Novocoat Protective Coatings, SC-1100 NovoFloor, NovoPipe, NovoPro,</td>
<td>P/S</td>
<td>0</td>
<td>100</td>
<td>300-500</td>
<td>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.</td>
</tr>
<tr>
<td>Novocoat Protective Coatings, SC-2100 NovoFloor, NovoShield Ceramic</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>160</td>
<td>Floor coatings for any shop, garage, or warehouse when chemical and wear resistance are less severe.</td>
</tr>
<tr>
<td>Novocoat Protective Coatings, SC-3100 NovoFloor, NovoShield Ceramic</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>160</td>
<td>High performance floor coatings such as aircraft hangers and first class protection for secondary containment.</td>
</tr>
<tr>
<td>Novocoat Protective Coatings, SC-3300 NovoPipe, NovoPro Epoxy</td>
<td>P</td>
<td>0</td>
<td>100</td>
<td>160</td>
<td>Maximum protection for steel, cast &amp; concrete pipe, professional coatings for the petro-chemical &amp; refining industries.</td>
</tr>
<tr>
<td>Novocoat Protective Coatings, SC-4600 NovoPipe Cycloaliphatic Epoxy, 2</td>
<td>P/T</td>
<td>27</td>
<td>98</td>
<td>157</td>
<td>Maximum protection for steel, cast &amp; concrete pipe.</td>
</tr>
<tr>
<td>Novocoat Protective Coatings, SC-2000, SP-2000R, SP-2000W NovoFloor,</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
<td>160</td>
<td>High performance floor coatings, maximum protection for steel, protective coating for the waste water industry, secondary containment, cooling towers, cast and concrete pipe.</td>
</tr>
<tr>
<td>Polibrid Coatings, Polibrid 670-S, Epoxy, 2</td>
<td>T</td>
<td>40</td>
<td>98</td>
<td>150</td>
<td>Warehouse floors, decorative show rooms, chemical processing plants, metal finishing plants, steel mills, food processing plants, sewage and water treatment plants, aircraft hangers and industrial plant floors</td>
</tr>
</tbody>
</table>

**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 water 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 ml
- 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
<table>
<thead>
<tr>
<th>Coatings</th>
<th>Type</th>
<th>Solids</th>
<th>Thickness</th>
<th>Notes</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polibrid Coatings, Polibrid 705, Elastomeric Polyurethane Aromatic, Chemical Cure, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>Tough, flexible, corrosion protection, unlimited build (20-250 mils), abrasion resistant, chemical resistant, highly impermeable, thermosetting</td>
<td>For concrete and steel in potable water service</td>
</tr>
<tr>
<td>Polibrid Coatings, Polibrid 706, Elastomeric Polyurethane Aromatic, Chemical Cure, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
<td>Tough, flexible, forms a highly impermeable membrane, thermosetting, solventless, odorless</td>
<td>Over geotextile fabrics for geomembrane liners, urethane foam, concrete and steel</td>
</tr>
<tr>
<td>PolySpec, PolySpec 100EX Epoxy, 2</td>
<td>P</td>
<td>0</td>
<td>100</td>
<td>Eliminates solvent odors, low viscosity formulation penetrates and seals concrete pores, provides superior adhesion, high tensile and flexural strengths, moisture tolerant.</td>
<td>Concrete primer, as part of a complete TuffRez flooring system or as part of a complete epoxy novolac lining system.</td>
</tr>
<tr>
<td>PolySpec, PolySpec 300EX Epoxy Performance Primer, 2</td>
<td>P</td>
<td>54</td>
<td>94</td>
<td>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.</td>
<td>Concrete primer, as part of a complete TuffRez flooring system or as part of a complete epoxy novolac lining system.</td>
</tr>
<tr>
<td>PolySpec, Thiokol FEC 2233 Flexible Epoxy, 2</td>
<td>I/T</td>
<td>0</td>
<td>100</td>
<td>Maintains toughness, excellent resistance to chipping, low odor, abrasion resistance. Some chemical resistance.</td>
<td>Concrete and steel for secondary containment, drum storage, vehicle unloading areas, covered parking decks, warehouse floors, aisles.</td>
</tr>
<tr>
<td>PolySpec, Thiokol FEC 2234 Polysulfide Epoxy, 2</td>
<td>I/T</td>
<td>0</td>
<td>100</td>
<td>Low odor, high abrasion, flexible, excellent chip resistance, penetration and bond strength, resistant to dilute acids, caustics and petroleum solvents, high abrasion resistance.</td>
<td>Concrete and steel for primary containment tanks, secondary containment dikes, loading docks, manufacturing floors, warehouse floors, drum storage areas, vehicle service bays.</td>
</tr>
<tr>
<td>PolySpec, Thiokol FNEC 2369 Epoxy Novolac, 2</td>
<td>I/T</td>
<td>0</td>
<td>100</td>
<td>Superior thermal compatibility with concrete, improved thermal shock resistance, superior flexiblity, for aggressive chemical environments.</td>
<td>Concrete floors, truck loading/unloading areas, secondary containment dikes, pump pads, pedestals, curbs, underground fuel storage tanks.</td>
</tr>
<tr>
<td>PolySpec, Thiokol FNEC 2515 Polysulfide-Modified Novolac Epoxy, 2</td>
<td>I/T</td>
<td>0</td>
<td>100</td>
<td>High impact resistance, excellent resistance to petroleum and urea ammonium nitrate products, flexible, flexible.</td>
<td>Concrete and steel for above ground tanks, underground fuel storage tanks, tank bottoms, rail car linings, secondary containment.</td>
</tr>
<tr>
<td>PolySpec, Thiokol LPE 5020 Novolac Epoxy Modified Polysulfide, 2</td>
<td>I/T</td>
<td>10</td>
<td>99</td>
<td>Fast setting elastomeric, low stress cure, easy mix and application, flexibility beyond conventional, high impact resistance.</td>
<td>Concrete and steel for bridges, fuel tanks, water tanks, offshore structures, structural steel, antenna towers concrete sturctures, roof coating for tanks &amp; buildings exposed to atmospheric corrosion.</td>
</tr>
<tr>
<td>PolySpec, Thiokol LPE 5100 Polysulfide-Modified Novolac Epoxy, 2</td>
<td>P/T</td>
<td>68</td>
<td>94</td>
<td>Excellent corrosion, impact, abrasion resistance, fast set time and cure, easy mix.</td>
<td>Concrete &amp; steel for bulkheads, pipe piles, H-piles, cranes, in-shore &amp; offshore petrochemical structures, ballast tanks, bridges, water &amp; wastewater structures, marine equipment, industrial &amp; commercial use.</td>
</tr>
<tr>
<td>PolySpec, TuffRez 232AR Aliphatic WB Polyurethane, 4</td>
<td>T</td>
<td>4</td>
<td>75</td>
<td>Superior wear resistance &amp; durability, minimizes effects of heavy industrial traffic, non-yellowing satin finish with excellent color retention, Zero VOC and low odor.</td>
<td>Recommended uses include high traffic manufacturing area, high traffic warehouse floors, corridors &amp; tunnelrs, airplane hangars.</td>
</tr>
</tbody>
</table>
### Rule 1113 Future Compliant Coatings
#### 2004-2005 Technology Assessment

December 2005

<table>
<thead>
<tr>
<th>Product</th>
<th>Application</th>
<th>Properties</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PolySpec, TuffRez 236 Aliphatic WB Polyurethane, 3</td>
<td>T 4 66 350 Recommended uses include laboratories, hospitals, educational facilities, animal holding areas, chemical processing plants and marine living quarters.</td>
<td>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.</td>
<td>3 hr recoat 6 mo</td>
</tr>
<tr>
<td>PolySpec, TuffRez 238, Epoxy Coating, 2</td>
<td>T 0 100 320 Recommended uses include industrial floors, laboratories, kitchens warehouse floors, traffic aisles, retail store traffic areas.</td>
<td>Orange peel textured finish, diffuses light, hides imperfections, seamless, resists many acids, alkalies and salts, easy to clean</td>
<td>N/A 35 min/1 yr</td>
</tr>
<tr>
<td>PolySpec, TuffRez 239, Epoxy Coating, 2</td>
<td>T 14 98 320 Recommended uses include industrial floors, light manufacturing areas, automotive service bays, shop areas, entranceways and aisles.</td>
<td>Non-skid texture diffuses light, hides imperfections, seamless, resists mechanical damage from foot traffic, resists many acids, alkalies and salts.</td>
<td>N/A 35 min/1 yr</td>
</tr>
<tr>
<td>PolySpec, TuffRez 240, Epoxy Liner, 2</td>
<td>P/T 0 100 16 Recommended uses include manholes, large diameter sewer pipes, lift station walls.</td>
<td>Excellent resistance to dilute acids, alkalies, wastewater and sewer gas, moisture insensitive.</td>
<td>8 hr tack-free 12 hr recoat 60 min/1 yr</td>
</tr>
<tr>
<td>PolySpec, TuffRez Epoxy Primer</td>
<td>P 0 90 175-250 Recommended for use as a concrete primer, as part of a complete TuffRez flooring system. For industrial and commercial.</td>
<td>Low viscosity formulation penetrates and seals concrete pores, provides superior adhesion.</td>
<td>24 hr recoat 45 min/1 yr</td>
</tr>
<tr>
<td>PPG High Performance Coatings, 4700 Aquapon Clear Self-leveling Epoxy, 2</td>
<td>P/T 0 100 80-320 Concrete floors</td>
<td>Abrasion and chemical resistant</td>
<td>9 hr touch 12 hr handle 24 hr recoat 30 min/N/A</td>
</tr>
<tr>
<td>PPG High Performance Coatings, SL-99-6800 MEGASEAL Series, Self-leveling Epoxy, Gloss 2</td>
<td>T 4 100 160/10 mls Properly prepared concrete and masonry, wood substrates, previously painted surfaces</td>
<td>Extremely hard wearing and durable, high chemical resistance, high-build, self-leveling</td>
<td>8 hr recoat 24 hr foot traffic 5 day cure 30 min/N/A</td>
</tr>
<tr>
<td>Premium Coatings, LLC, Premium Liquid Rubber®, Premium 204 Grade</td>
<td>P/T 0 N/A N/A Fully bonds to most substrates. Numerous applications such as corrosion and rust protection of most metals, waterproofing &amp; concrete protection, roofing repairs.</td>
<td>Water based, odorless, non toxic, free of VOC's, single component.</td>
<td>24 hr cure Single component/1 yr</td>
</tr>
<tr>
<td>Premium Coatings, LLC, Premium Liquid Rubber® Spray Grade, 2</td>
<td>P/T 0 N/A N/A Numerous applications such as corrosion and rust protection of most metals, waterproofing &amp; concrete protection, roofing repairs.</td>
<td>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.</td>
<td>48 hr cure N/A/1 yr</td>
</tr>
<tr>
<td>RainGuard International Products Co, VandiGuard Non-Sacrificial Graffiti Coating</td>
<td>T 100 34 200-400 New or Existing masonry, concrete, brick, stucco, stone, metal, wood</td>
<td>Tough and durable, graffiti resistant, cross-linking co-polymer, dries clear, I/E surfaces</td>
<td>1 hr touch 1-2 hr recoat 72-96 hr cure Single Component</td>
</tr>
<tr>
<td>RainGuard International Products Co, VandTop Sacrificial Graffiti Coating</td>
<td>T 80 N/A 140-300 Masonry, painted surfaces, metal, wood</td>
<td>For I/E surfaces, dries clear, removal using low-pressure hot water</td>
<td>1 hr touch 1-2 hr recoat 36-48 hr cure Single Component</td>
</tr>
<tr>
<td>Rock-Tred, Aqua-Rock Water Based Epoxy, 2</td>
<td>P 46 52 250-300 Interior primer/coating for areas that are subjected to medium to heavy traffic and moderate chemical spillage.</td>
<td>Waterborne, solvent free, VOC compliant, easy mixing ratio, excellent gloss, moderate chemical and adhesion resistance, fast drying time, good mar resistance, cleans easily.</td>
<td>2-5 hr recoat 7 day cure 30-40 min/2 yrs</td>
</tr>
<tr>
<td>Rock-Tred, Chem-Rock LT-Seal/Cat Epoxy, 2</td>
<td>S 0 100 150 For moderate traffic and chemical spillage. It can also be used as a faster setting epoxy at ambient temps.</td>
<td>Cures at low temps, fast cure, solvent-free, gloss finish, good chemical and abrasion resistance.</td>
<td>6-8 hr recoat 25 min/2 yrs</td>
</tr>
<tr>
<td>Rock-Tred, Chem-Rock Polyamide Epoxy, 2</td>
<td>P 0 100 200 For areas that require self leveling or are too cold for Aqua-Rock.</td>
<td>Solvent-free, excellent adhesion, damp substrate tolerance.</td>
<td>6-8 hr recoat 15-20 min/2 yrs</td>
</tr>
<tr>
<td>Rock-Tred, Chem-Rock Seal/Cat Epoxy, 2</td>
<td>S 0 100 150 For areas that are subjected to medium to heavy traffic and moderate chemical spillage. Also used as a binder resin.</td>
<td>Solvent free, gloss finish, durable, resistance to yellowing, Moderate chemical and good abrasion resistance.</td>
<td>6-8 hr recoat 30 min/2 yrs</td>
</tr>
<tr>
<td>Rock-Tred, Chem-Rock Slurry Epoxy, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>-----------------------------------------</td>
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<tr>
<td>Rock-Tred, Conduroc CR ESD Top Coat Novolac Epoxy, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Rock-Tred, Conduroc ESD Top Coat Epoxy, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Rock-Tred, Eco-Poxi Epoxy, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Rock-Tred, Elasti-Poxi Membrane Reactive Epoxy, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Rock-Tred, Exteseal Water Based Silane-Modified Siloxane</td>
<td>S</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Rock-Tred, Novo-Brite Clear Novolac Epoxy, 2</td>
<td>T</td>
<td>12</td>
<td>100</td>
</tr>
<tr>
<td>Rock-Tred, Novo-Poxi Novolac Epoxy, 2</td>
<td>T</td>
<td>12</td>
<td>100</td>
</tr>
<tr>
<td>Rock-Tred, Novo-Poxi LT Novolac Epoxy, 2</td>
<td>T</td>
<td>12</td>
<td>100</td>
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<tr>
<td>Rock-Tred, Penetred Water Based Penetrating Epoxy, 2</td>
<td>P/S</td>
<td>0</td>
<td>38</td>
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<tr>
<td>Rock-Tred, Poxi-Rock CR-Flooring Epoxy, 3</td>
<td>P</td>
<td>0</td>
<td>100</td>
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<tr>
<td>Rock-Tred, Poxi-Rock CR-Primer Epoxy, 2</td>
<td>P</td>
<td>8</td>
<td>100</td>
</tr>
<tr>
<td>Rock-Tred, Poxi-Rock CR-Top Dressing Thixotropic Novolac Epoxy, 2</td>
<td>T</td>
<td>12</td>
<td>100</td>
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<tr>
<td>Rock-Tred, Posti-Rock Flooring Epoxy, 3</td>
<td>T</td>
<td>12</td>
<td>99</td>
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<tr>
<td>Rock-Tred, Posti-Rock LT Flooring Thixotropic Epoxy, 2</td>
<td>T</td>
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<td>100</td>
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<tr>
<td>Rock-Tred, Posti-Rock LT Primer Epoxy, 2</td>
<td>P</td>
<td>0</td>
<td>100</td>
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<tr>
<td>Rock-Tred, Resn-X Dressing, Novolac based Vinyl Ester, 2</td>
<td>T</td>
<td>74</td>
<td>97</td>
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<tr>
<td>Rock-Tred, Resn-X Intermediate, Novolac based Vinyl Ester, 2</td>
<td>I</td>
<td>74</td>
<td>97</td>
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<tr>
<td>Rock-Tred, Resn-X Primer, Novolac based Vinyl Ester, 2</td>
<td>P</td>
<td>74</td>
<td>97</td>
</tr>
<tr>
<td>Sherwin Williams, 1.22 DTM Bonding Primer, WB Acrylic Emulsion</td>
<td>P</td>
<td>51</td>
<td>42</td>
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<tr>
<td>Sherwin Williams, TRM.51 Magnaplate, Vinyl Ester Novolac Laminate System, 2</td>
<td>T</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>Sherwin Williams, 1.27 Bond-Plex WB Acrylic Coating</td>
<td>T</td>
<td>48</td>
<td>41</td>
</tr>
<tr>
<td>Sherwin Williams, 2.30 Tower-Guard HS Oil/alkyd Coating Transmission Tower Coating B54AZ600</td>
<td>T</td>
<td>70</td>
<td>89</td>
</tr>
<tr>
<td>Sherwin Williams, 5.30 Centurion, WB Urethane High Gloss 2</td>
<td>T</td>
<td>66</td>
<td>58</td>
</tr>
<tr>
<td>Sherwin Williams, 6.11 Zinc Chromate, WB Inorganic Zinc-Rich Coating 2</td>
<td>P</td>
<td>0</td>
<td>68</td>
</tr>
<tr>
<td>Sherwin Williams, 8.11 ArmorSeal 33 Epoxy Primer/Sealer, 2</td>
<td>P</td>
<td>&lt;20</td>
<td>87</td>
</tr>
<tr>
<td>Sherwin Williams, 8.20 ArmorSeal 33 Epoxy Primer/Sealer, 2</td>
<td>P</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Sherwin Williams, 8.25 ArmorSeal 650 SL/RC, Self-leveling Recoatable Epoxy, 2</td>
<td>T</td>
<td>3</td>
<td>100</td>
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<tr>
<td>Sherwin Williams, 8.50 ArmorSeal Armor-Plex WB Urethane, 2</td>
<td>T</td>
<td>41</td>
<td>58</td>
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<tr>
<td>Sherwin Williams, TRM 17 Cor-Cote HP FF Flake Filled Epoxy, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
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<tr>
<td>Sherwin Williams, TRM 33 Dura-Plate UHS Primer, Ultra High Solids Epoxy Amine, 2</td>
<td>P/I</td>
<td>40</td>
<td>98</td>
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<tr>
<td>Sherwin Williams, TRM 37 Nova-Plate UHS Primer Ultra High Solids Epoxy novolac amine, 2</td>
<td>P</td>
<td>12</td>
<td>98</td>
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<tr>
<td>Sherwin Williams, TRM 72 Corobond LT Low Temp Epoxy, 2</td>
<td>P</td>
<td>0</td>
<td>100</td>
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<tr>
<td>Sherwin Williams, TRM 73 Corobond 100 Epoxy P/S</td>
<td>P</td>
<td>13</td>
<td>98</td>
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<tr>
<td>Sherwin Williams, TRM 74 Corobond Conductive Epoxy Primer, 2</td>
<td>P</td>
<td>0</td>
<td>100</td>
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<tr>
<td>Sherwin Williams, TRM 77 Cor Cote E.N. 7000 High Build Epoxy Novolac Coating, 2</td>
<td>T</td>
<td>0</td>
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</tr>
<tr>
<td>Sherwin Williams, TRM 78 Sher-Tuff Epoxy Flexible Coating, 2</td>
<td>P</td>
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<tr>
<td>Sherwin Williams, TRM 79 Sher-Tuff Urethane Enamel Coating, 2</td>
<td>T</td>
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</tr>
<tr>
<td>Sherwin Williams, TRM 85 EnviroLastic AR425, 2</td>
<td>I/T</td>
<td>0</td>
<td>100</td>
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<tr>
<td>Sherwin Williams, TRM 86 EnviroLastic AR200 HD, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Sherwin Williams, TRM 88 EnviroLastic AR520 SS, 2</td>
<td>P/I</td>
<td>0</td>
<td>100</td>
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<tr>
<td>Sherwin Williams, TRM 90 EnviroLastic AL450 SS, 2</td>
<td>T</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Company</td>
<td>Product Name</td>
<td>Application</td>
<td>Characteristics</td>
</tr>
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<td>---------------------------------</td>
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<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>Sherwin Williams, TRM 91</td>
<td>EnviroLastic AR520</td>
<td>Pipes, steel and concrete tanks, concrete reservoirs, brine tanks, aquariums, ponds, fish hatcheries</td>
<td>Aromatic polyurea coating, fast cure, seamless, flexible, waterproof</td>
</tr>
<tr>
<td>Specialty Products, Inc.</td>
<td>Durashield II, Acrylic Elastomeric Coating</td>
<td>Wooden substrates, asphalt surfaces, masonry and concrete, protective coatings for foam pipes, roofing</td>
<td>Fire retardant, excellent adhesion, breathable membrane, exceptional weatherability, resists mechanical damage and chemical attack, high build capabilities</td>
</tr>
<tr>
<td>Specialty Products, Inc.</td>
<td>EP-100 Primer,</td>
<td>Concrete</td>
<td>Superior adhesion, easy to use</td>
</tr>
<tr>
<td>Specialty Products, Inc.</td>
<td>Hard CAP-100, Clear Aliphatic Polyurea</td>
<td>Floors, walls, ceilings, clean rooms, hospitals, fountains, reflection pools, aquariums</td>
<td>Extended tack time for penetration, high temperature stability, high abrasion resistance</td>
</tr>
<tr>
<td>Specialty Products, Inc.</td>
<td>Polyshield HT, Elastomeric Polyurea</td>
<td>Steel, concrete tanks, ponds, lagoons, reservoirs, barges, encapulation</td>
<td>Extended tack time for penetration, high temperature stability, high abrasion resistance</td>
</tr>
<tr>
<td>Specialty Products, Inc.</td>
<td>Hardshield 100, Elastomeric Polyurea</td>
<td>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</td>
<td>Hydrophobic, built to any thickness in one application, high temperature stability, high elongation for crack bridging, excellent encapsulation</td>
</tr>
<tr>
<td>Superior Environmental Products</td>
<td>EC-315 NovoSeal</td>
<td>Chutes, fan housing blades, dry bag-house ducts, pump rebuilding, slurry tanks, ideal for concrete</td>
<td>High-density, ceramic-filled, excellent chemical wear and abrasion resistance</td>
</tr>
<tr>
<td>Superior Environmental Products</td>
<td>ER-1000R NovoFlex</td>
<td>Concrete base coat, asphalt/metal/concrete topcoat for floors, foundations, secondary containment, cooling towers and pipes</td>
<td>Elastomeric, contains recycled ground rubber, excellent adhesion, long-term water resistance</td>
</tr>
<tr>
<td>Superior Environmental Products</td>
<td>SC-1100 NovoPro Novolac Primer</td>
<td>Porous concrete at petro-Chemical and Refining industries, ideal for floors and secondary containment, slow cure</td>
<td>Penetrating, excellent chemical and heat resistance, for immersion service, bond both chemically and mechanically.</td>
</tr>
<tr>
<td>Superior Environmental Products</td>
<td>SC-3100 NovoFloor</td>
<td>Excellent coating for high traffic floor areas, secondary containment</td>
<td>Excellent chemical and heat resistance, excellent wear resistance</td>
</tr>
<tr>
<td>Superior Environmental Products</td>
<td>SC-3300 NovoPro</td>
<td>Excellent tank liner at petro-chemical and refining industries</td>
<td>Long term chemical resistance and immersion service</td>
</tr>
<tr>
<td>Superior Environmental Products</td>
<td>SC-3406 NovoPro</td>
<td>Immersion service at petro-chemical and refining industries, stacks, ducts, chemical line, thin/slurry tanks</td>
<td>Excellent chemical and heat resistance, excellent wear resistance</td>
</tr>
<tr>
<td>Superior Environmental Products</td>
<td>SC-5400 NovoStar</td>
<td>Floors, ducts, wet scrubbers, secondary containment, steel/concrete tanks, process vessels, storage tanks</td>
<td>Maximum heat and chemical resistance, excellent wear resistance</td>
</tr>
<tr>
<td>Superior Environmental Products</td>
<td>SP-2000R NovoTower, contains rubber additive</td>
<td>Ideal for concrete in aqueous service such as cooling towers, waste-water management, wet wells, manholes</td>
<td>Excellent chemical and heat resistance, superior cond both mechanically and chemically to the substrate, excellent wear resistance</td>
</tr>
<tr>
<td>Tamms Industries, Duralkote 240</td>
<td>High Build Flexible Epoxy</td>
<td>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</td>
<td>High build, flexible, excellent chemical and abrasion resistance.</td>
</tr>
<tr>
<td>Thorotex America, Inc.</td>
<td>Chemi-Tech 152 L.V. Epoxy</td>
<td>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.</td>
<td>High performance, solvent free, corrosion resistant, exceptional application and film rebuild properties.</td>
</tr>
<tr>
<td>Company</td>
<td>Product</td>
<td>Code</td>
<td>Touch Time</td>
</tr>
<tr>
<td>---------</td>
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<td>------</td>
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</tr>
<tr>
<td>Thortex America, Inc., Chemi-Tech C.R. Epoxy</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Thortex America, Inc., Chemi-Tech E.P. Epoxy</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Thortex America, Inc., Chemi-Tech P.U. Polyurethane</td>
<td>P</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Thortex America, Inc., Chemi-Tech U.C. Epoxy</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Thortex America, Inc., Chemi-Tech U.S.R. Epoxy</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Thortex America, Inc., Chemi-Tech U.W. Epoxy</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Thortex America, Inc., Corro-Tech G.P. Solvent Based Epoxy</td>
<td>P/T</td>
<td>78</td>
<td>90</td>
</tr>
<tr>
<td>Thortex America, Inc., Corro-Tech W.B. Epoxy</td>
<td>P</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td>Thortex America, Inc., Floor-Tech F.B. Polyurethane</td>
<td>I/T</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Thortex America, Inc., Floor-Tech H.B. Epoxy</td>
<td>P/T</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Thortex America, Inc., Floor-Tech S.P. Epoxy Primer</td>
<td>P/S</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Thortex America, Inc., Floor-Tech W.B. Epoxy</td>
<td>T</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>Thortex America, Inc., Floor-Tech W.B.X. Epoxy</td>
<td>P/T</td>
<td>44</td>
<td>50</td>
</tr>
<tr>
<td>Thortex America, Inc., Uni-Tech G.P. Epoxy Primer</td>
<td>P</td>
<td>0</td>
<td>45</td>
</tr>
<tr>
<td>Thortex America, Inc., Wall-Tech A.G. Water-Based Polyurethane</td>
<td>T</td>
<td>65</td>
<td>17</td>
</tr>
<tr>
<td>Coating Company and Product Name</td>
<td>Interior Exterior</td>
<td>VOC content (gm/l)</td>
<td>Solids (%) by volume</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-------------------</td>
<td>-------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Thortex America, Inc., Wall-Tech F.P. Single Component Water-Based Weatherproofing Coating</td>
<td>S</td>
<td>0</td>
<td>60</td>
</tr>
<tr>
<td>Thortex America, Inc., Wall-Tech U.V. Water-Based Polyurethane</td>
<td>T</td>
<td>65</td>
<td>50</td>
</tr>
<tr>
<td>Van Technologies Inc, Isocrete Moisture Curable Polyurethane</td>
<td>T</td>
<td>39</td>
<td>N/A</td>
</tr>
<tr>
<td>ZBC, Galvanizing Compound Flat Metallic Zinc Coating, 1 part liquid : 3.1 parts zinc powder</td>
<td>P</td>
<td>0</td>
<td>44</td>
</tr>
<tr>
<td>N/A= Not Available</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Nonflats (High Gloss ≤ 50 g/l)

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

### Nonflats (Medium Gloss ≤ 50 g/l)

<table>
<thead>
<tr>
<th>Coating Company and Product Name</th>
<th>Interior Exterior</th>
<th>VOC content (gm/l)</th>
<th>Solids (%) by volume</th>
<th>Coverage (sq ft/gal)</th>
<th>Recommended Substrate/Exposure</th>
<th>Coating Characteristics</th>
<th>Dry time to recoat</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Formulating and Manufacturing Safecoat Semi Gloss Zero VOC</td>
<td>I</td>
<td>0</td>
<td>N/A</td>
<td>350</td>
<td>Walls, ceilings, wallboard, properly cured and primed plaster, masonry and primed metal Superior durable finish, odor free</td>
<td>1 hr touch</td>
<td>4 hr recoat</td>
</tr>
<tr>
<td>Company</td>
<td>Product</td>
<td>Sheen</td>
<td>Coverage</td>
<td>Wood, plaster, masonry, properly primed metal</td>
<td>High hiding, durable, washable, spatter resistant</td>
<td>Time</td>
<td></td>
</tr>
<tr>
<td>---------</td>
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<td>-------------------------------------------------</td>
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<td></td>
</tr>
<tr>
<td>Benjamin Moore, 224 Pristine Eco Spec Acrylic Latex Semi Gloss Enamel</td>
<td>I</td>
<td>12</td>
<td>36</td>
<td>400-450</td>
<td>Wood, plaster, masonry, properly primed metal</td>
<td>High hiding, durable, washable, spatter resistant</td>
<td>2 hrs</td>
</tr>
<tr>
<td>California Paints, Fres-Coat Acrylic Semi Gloss 663XX</td>
<td>I</td>
<td>35</td>
<td>39</td>
<td>250-400</td>
<td>Plaster, sheetrock, wallboard, concrete, masonry block, wood, primed metal, galvanized metal, acoustical surfaces</td>
<td>Sheen 45 @ 60°, extremely durable, anti-spatter, superior leveling, adhesion, color retention &amp; scrubability</td>
<td>2 hrs</td>
</tr>
<tr>
<td>Cloverdale Paint, 70721 Semi Gloss Latex</td>
<td>I</td>
<td>0</td>
<td>52</td>
<td>340-500</td>
<td>For Institutional and public buildings such as schools, institutions, hospitals, hotels, offices, residential homes.</td>
<td>Semi-gloss</td>
<td>30 min touch</td>
</tr>
<tr>
<td>Color Wheel Paints &amp; Coatings, 5520 Hi-Hide Low VOC Wall Paint Vinyl Acrylic Latex</td>
<td>I</td>
<td>1</td>
<td>37</td>
<td>300-500</td>
<td>Concrete, masonry, wood surfaces, gypsum wallboard, properly primed ferrous metals, aluminum and galvanized metals</td>
<td>Sheen 30-40 @ 60°, outstanding touchup, exceptional hiding, scrubbable, washable</td>
<td>4 hrs</td>
</tr>
<tr>
<td>Columbia Paint &amp; Coatings, Professional Pro-Choice Vinyl Acrylic Latex Semi-Gloss 02-792</td>
<td>I</td>
<td>46</td>
<td>31</td>
<td>325</td>
<td>Wood, drywall, plaster, masonry, concrete, properly primed metal</td>
<td>Sheen 24-32 @ 60°, excellent touch-up, dries rapidly</td>
<td>2-4 hrs</td>
</tr>
<tr>
<td>Columbia Paint &amp; Coatings, Purecoat Low Odor Acrylic Semi-Gloss 05-572</td>
<td>I</td>
<td>0</td>
<td>40</td>
<td>360</td>
<td>Wood, drywall, plaster, masonry, concrete, properly primed metal</td>
<td>Sheen 45-55 @ 60°, very good flow and leveling, good hiding, excellent spatter resistance, excellent stain removal and adhesion</td>
<td>12-16 hrs</td>
</tr>
<tr>
<td>Coronaflx Paints, 926-1 Air Care Odorless Acrylic Semi-Gloss</td>
<td>I</td>
<td>0</td>
<td>39</td>
<td>450</td>
<td>Walls, woodwork, drywall, plaster, masonry, proper primed metal</td>
<td>Sheen 45-55 @ 85°, flows easily, excellent hiding power, dries quickly, scrubbable</td>
<td>30 min touch</td>
</tr>
<tr>
<td>Duron Paints &amp; Wallcoverings, W 550 Sierra Acrylic Semi-Gloss Enamel</td>
<td>I</td>
<td>1</td>
<td>39</td>
<td>350-400</td>
<td>Drywall, masonry, wood, properly primed metal</td>
<td>Low VOC and odor, no added solvents, provides a durable, washable film and has excellent hide, block resistance, and adhesion.</td>
<td>1-2 hr touch</td>
</tr>
<tr>
<td>Dunn Edwards, W 603 Ecosheild Acrylic Semi-Gloss</td>
<td>I</td>
<td>8</td>
<td>38</td>
<td>350-400</td>
<td>For residential and commercial office buildings, schools, hospitals, residential and other closed ventilated buildings on drywall, masonry, wood metal</td>
<td>Low VOC and odor, no added solvents, provides a durable, washable film and has excellent hide, block resistance, and adhesion.</td>
<td>1-2 hr touch</td>
</tr>
<tr>
<td>Dunn Edwards, 83 Line, Acrylic Latex Semi-Gloss Enamel</td>
<td>I</td>
<td>15</td>
<td>39</td>
<td>400</td>
<td>Walls, ceilings, trim, woodwork</td>
<td>Scrubbable, resistant to household dirt &amp; stains, mildew resistant</td>
<td>1 hr touch</td>
</tr>
<tr>
<td>Frazee Paint (PPI), 032 Environkote Semi Gloss Finish</td>
<td>I</td>
<td>6</td>
<td>36</td>
<td>200-400</td>
<td>Concrete, masonry, drywall, hardboard, properly primed metal, plaster, wood</td>
<td>Sheen 60-70 @ 60°, resistant to abrasion, blocking, washing, yellowing</td>
<td>2-4 hr touch</td>
</tr>
<tr>
<td>General Paint (PPI), 54-020 HP3000 Semi-Gloss AcrylicFinish</td>
<td>I</td>
<td>7</td>
<td>35</td>
<td>275-370</td>
<td>Interior applications in high wear areas such as schools, hospitals, care facilities, public areas and institutions</td>
<td>Excellent hiding power, incredible scrub resistance, superior application properties, outstanding adhesion, fast dry, low odor</td>
<td>15-30 min touch</td>
</tr>
<tr>
<td>General Paint (PPI), 59-020 Z-Coat Semi-Gloss 100% Acrylic</td>
<td>I</td>
<td>6</td>
<td>35</td>
<td>275-370</td>
<td>Interior applications in high wear areas with high maintenance such as schools, hospitals, care facilities, public areas and institutions</td>
<td>Durable, fast-drying, washable</td>
<td>15-30 min touch</td>
</tr>
<tr>
<td>Hallman Lindsay Quality Paints, 281 Comfort Kote Vinyl/Acrylic Semi-Gloss</td>
<td>I</td>
<td>0</td>
<td>39</td>
<td>350</td>
<td>Walls and ceilings made of drywall, plaster or masonry and wood surfaces</td>
<td>Sheen 30-40 units @ 60°, Excellent hiding and touch-up, good stain removal and washability</td>
<td>2 hr touch</td>
</tr>
<tr>
<td>Hallman Lindsay Quality Paints, 296 Latex Semi-Gloss Enamel</td>
<td>I</td>
<td>33</td>
<td>35</td>
<td>400</td>
<td>For walls, ceilings and trim, wood, drywall, masonry and metals.</td>
<td>High-hiding, low-odor, quick-drying, soap and water clean-up, scrubbable.</td>
<td>1 hr touch</td>
</tr>
<tr>
<td>ICI Paints (Durol), 1486-1200 Spraymaster Pro, Uni-Grip-WB Aquagray Dryfall Semi-Gloss Primer &amp; Finish</td>
<td>I/E</td>
<td>39</td>
<td>40</td>
<td>350-450</td>
<td>For ceilings and multiple overhead surfaces such as those in offices warehouse, stores, hotels, textile mills and industrial plants, suitable for galvanized decking.</td>
<td>Excellent adhesion, resists flash rusting, easy clean-up of overspray, low odor, good moisture resistance</td>
<td>15 min touch</td>
</tr>
<tr>
<td>Company Name</td>
<td>Paint Type</td>
<td>Details</td>
<td>Surface Compatibility</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>ICI Paints (Delux), 2000 Lifemaster Semi-Gloss</td>
<td>I</td>
<td>0 39 400 Interior walls and ceilings</td>
<td>Bonds to glossy surface, excellent washability, excellent stain resistance, quick drying, durable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovative Formulations Company, Semi-Gloss, WB Acrylic Urethane</td>
<td>I/E</td>
<td>0 N/A 400-450 Drywall, plaster, concrete, most masonry surfaces, covers properly primed wood &amp; metal</td>
<td>One coat, fast dry, strong adhesion, excellent weather-ability, durability, scrub resistance, Sheen 30-40 @ 60º</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovative Formulations Company, Mold Not, High Gloss Paint, WB Multi Shell Acrylic</td>
<td>I</td>
<td>0 N/A 400-450 Drywall, plaster, concrete, most masonry surfaces, covers properly primed wood &amp; metal</td>
<td>Resistance to fungi, one coat, fast dry, strong adhesion, excellent weather-ability, durability, scrub resistance, Sheen 50 @ 60º according to manufacturer.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovative Formulations Company, Mold Not, Semi-Gloss Paint, WB Multi Shell Acrylic</td>
<td>I</td>
<td>0 N/A 400-450 Drywall, plaster, concrete, most masonry surfaces, covers properly primed wood &amp; metal</td>
<td>Resistance to fungi, one coat, fast dry, strong adhesion, excellent weather-ability, durability, scrub resistance, Sheen 30-65 @ 60º</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kelly-Moore Paints, 1520 Envirotone Acrylic Semi Gloss Enamel</td>
<td>I</td>
<td>0 39 300-400 Wallboard, plaster, masonry, walls, trims</td>
<td>Sheen 50-55 @ 60º, non-polluting, anti-microbial properties</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lanco Paints, OF-260 Acrylic Semi-Gloss Latex Enamel</td>
<td>I</td>
<td>40 31 450 Kitchens, bathrooms, and playrooms</td>
<td>Durable and tough, mildew and stain resistant, chalk resistant superior scrubbability, fast drying</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miller Paint Company, #M2850 Acrylic Semi-Gloss Latex</td>
<td>I</td>
<td>5 34 300-350 Hospital rooms, nursing homes, classrooms, kids rooms, bathroom, kitchens</td>
<td>Antimicrobial, non-yellowing, long term durability, excellent leveling and flow</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miller Paint Company, #M6150 Super Acrylic Semi-Gloss Latex</td>
<td>I</td>
<td>5 40 400-500 Ideal for high-traffic areas such as den, bathroom, kitchen</td>
<td>Antimicrobial, outstanding hide, splatter resistant, good durability and washability, solvent free</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morwear Manufacturing Inc, 190-01 Semi-Gloss 100% Acrylic Wall &amp; Trim Enamel</td>
<td>I</td>
<td>12 44 300-400 Walls, trim, masonry, drywall, plaster, concrete, primed wood, primed metal, previously painted surfaces</td>
<td>Semi-gloss finish, superior hide, stain resistant, maximum durability</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parker Paint (PPH), 5950 Premium Great Northwest Klean-Air Latex Coating (Vinyl Acetate)</td>
<td>I</td>
<td>2 31 300-350 Walls and ceilings, wood work and trim, masonry, concrete</td>
<td>Sheen 50-60 @ 60º, environmentally friendly</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pittsburgh Paints (PPG), 9-500 Series Pure Performance Semi-Gloss Acrylic Latex</td>
<td>I</td>
<td>0 37 350-400 For residential and commercial use on aluminum, concrete, drywall, ferrous metal wood galvanized steel, masonry, plaster, stucco</td>
<td>Zero VOC, low odor, excellent hiding, touch up, anti-microbial properties.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pittsburgh Paints (PPG), 9-510 Series Pure Performance Acrylic Semi-Gloss Latex</td>
<td>I</td>
<td>0 37 400-450 Properly primed aluminum, galvanized steel, ferrous metal, plaster, wood, concrete, masonry, stucco, drywall</td>
<td>Sheen 25-35 @ 60º, excellent adhesion and hiding power, scrubbable, anti-microbial</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portland Paint Company, 533501 Horizon Low Gloss, Acrylic Emulsion</td>
<td>I</td>
<td>4 40 320 Walls and woodwork</td>
<td>Sheen 45-55 @ 60º, low odor, enamel finish, non-toxic, good resistance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portland Paint Company, 543501 Horizon Semi Gloss</td>
<td>I</td>
<td>4 40 320 Walls and woodwork</td>
<td>Sheen 25-35 @ 60º, low odor, enamel finish, non-toxic, good resistance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sherwin Williams, 101.60 Harmony Styreneated Acrylic Latex Semi Gloss B-10 Series</td>
<td>I</td>
<td>0 40 350-400 Block, drywall, masonry, plaster, wood</td>
<td>Sheen 35-45 @ 60º, anti-microbial</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sherwin Williams, 101.69 Duration Home, Latex Semi Gloss A98-100 Series</td>
<td>I</td>
<td>39 35 350-400 For masonry, concrete, cement, block, drywall, plaster, wood, composition board</td>
<td>Resistant to stains, scuffs, burning, smooth even finish, anti-microbial</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sherwin Williams, 102.23 Duration Latex Gloss, K34 Series</td>
<td>E</td>
<td>50 40 250-300 For homes on wood, stucco masonry/cement composition panels, aluminum siding vinyl siding galvanized metal</td>
<td>One coat application, self priming, superior hiding flexible resists blistering and peeling.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coating Company and Product Name</td>
<td>Interior</td>
<td>Exterior</td>
<td>VOC content (gm/l)</td>
<td>Solids (% by volume)</td>
<td>Coverage (sq ft/gal @3mils)</td>
<td>Recommended Substrate/Exposure</td>
<td>Coating Characteristics</td>
</tr>
<tr>
<td>--------------------------------</td>
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</tr>
<tr>
<td>Sierra Performance (Rust-Oleum), S-16 Wall and Trim Enamel, WB Epoxy-Acrylic Semi-Gloss, 2</td>
<td>I</td>
<td>0</td>
<td>50</td>
<td>135-270</td>
<td>Properly primed doors, dry wall, concrete, wood, metal, tile</td>
<td>Excellent chemical, mildew and stain resistance, Exceptional durability, fast drying, 18 hr pot life</td>
<td>30 min touch</td>
</tr>
<tr>
<td>Sierra Performance (Rust-Oleum), S38 Beyond Multi-Purpose Enamel, WB Satin Acrylic Urethane</td>
<td>I/E</td>
<td>0</td>
<td>37</td>
<td>165-520</td>
<td>Doors, cabinets, trim, furniture, equipment, tanks</td>
<td>Excellent durability, non-blocking, mar resistant</td>
<td>2-4 hrs</td>
</tr>
<tr>
<td>Southern Diversified Products, 102 Line, American Pride, 100% Acrylic Semi-Gloss Enamel</td>
<td>I</td>
<td>5</td>
<td>37</td>
<td>400</td>
<td>For use in residential and commercial facilities on drywall, plaster, wallcovering, metal, wood and wood paneling.</td>
<td>Low VOC and odor, soap and water cleanup, antimicrobial, stain resistant, tough, durable, high bonding.</td>
<td>2 hr touch</td>
</tr>
<tr>
<td>Vista Paint, 6400 Earth Coat Acrylic Semi Gloss</td>
<td>I</td>
<td>16</td>
<td>39</td>
<td>350-400</td>
<td>Interior drywall, plaster, masonry, concrete, wood</td>
<td>Resistant to scuffing, staining and abrasion, excellent hide, touch up, superior adhesion</td>
<td>1 hr touch</td>
</tr>
<tr>
<td>N/A= Not Available</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Nonflats (Low-Gloss ≤ 50 g/l)**

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

**Page 33 of 53**
<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Product Name</th>
<th>Sheen</th>
<th>Viscosity</th>
<th>Application</th>
<th>Effects</th>
<th>Drying Time</th>
<th>Touch Dry Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frazee Paint (PPI), 029 Envirokote Eggshell Finish, Acrylic Copolymer Resins</td>
<td>200-400</td>
<td>Interior walls, ceilings, trim on concrete/masonry, drywall, hard board, metal, plaster, wood</td>
<td>Sheen 28-35 @ 85°, resistant to abrasion, blocking washing, yellowing</td>
<td>2-4 hr touch</td>
<td>18 hr recoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuhr International, 6100 ZVOC Acrylic Latex Paint, Flat and Eggshell</td>
<td>305-30</td>
<td>Interior surfaces</td>
<td>Great scrubability, fast dry, excellent durability and coverage, self priming, hypo allergenic formula</td>
<td>30 mins</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Paint (PPI), 54-030 HP3000 Eggshell Acrylic Finish</td>
<td>305-405</td>
<td>Interior applications in high wear areas such as schools, hospitals, care facilities, public areas and institutions</td>
<td>Excellent hiding power, incredible scrub resistance, superior application properties, outstanding adhesion, fast dry, low odor</td>
<td>15-30 min touch</td>
<td>1 hr handle</td>
<td>2-4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>General Paint (PPI), 59-030 Z-Coat Eggshell 100% Acrylic</td>
<td>305-405</td>
<td>Interior applications in high wear areas with high maintenance such as schools, hospitals, care facilities, public areas and institutions</td>
<td>Durable, fast-drying, washable</td>
<td>15-30 min touch</td>
<td>1 hr handle</td>
<td>2-4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Hallman Lindsay Quality Paints, 274 Comfort Kote Vinyl Eggshell</td>
<td>350</td>
<td>Walls and ceilings made of drywall, plaster or masonry and wood surfaces</td>
<td>Sheen 12-15 units @ 60°, Excellent hiding and touch-up, good stain removal and washability</td>
<td>2 hr touch</td>
<td>4 hr recoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hallman Lindsay Quality Paints, 294 Pro Kote Latex Stain Enamel</td>
<td>400</td>
<td>For residential use on walls, ceiling and trim.</td>
<td>High-hiding, uniform satin finish, low-odor, scrubbable, soap and water clean-up</td>
<td>1 hr touch</td>
<td>4 hr recoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICI Paints (Dulux), 1482-1200 Spraymaster Pro, Uni-Grip-WB Aquacrylic Dryfall Eggshell Primer &amp; Finish</td>
<td>272-361</td>
<td>For ceilings and multiple overhead surfaces such as those in offices warehouse, stores, hotels, textile mills and industrial plants, suitable for galvanized decking.</td>
<td>Excellent adhesion, resists flash rusting, easy clean-up of overspray, low odor, good moisture resistance.</td>
<td>15 min touch</td>
<td>2 hr recoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovative Formulations Company, Egg Shell, WB Acrylic Urethane</td>
<td>N/A</td>
<td>Drywall, plaster, concrete, most masonry surfaces, covers properly primed wood &amp; metal</td>
<td>Sheen 8-15 @ 60°, one coat, fast dry, excellent weatherability, durability, scrub resistance, strong adhesion</td>
<td>1 hr touch</td>
<td>2 hr recoat</td>
<td>24 hr hard dry</td>
<td></td>
</tr>
<tr>
<td>Innovative Formulations Company, Mold Not Egg Shell, WB Multi Shell Acrylic</td>
<td>400-450</td>
<td>Drywall, plaster, concrete, most masonry surfaces, covers properly primed wood &amp; metal</td>
<td>Sheen 12-20 @ 60°, resistant to fungi, one coat, fast dry, strong adhesion, excellent weather-ability, durability, scrub resistance</td>
<td>1 hr touch</td>
<td>2 hr recoat</td>
<td>24 hr hard dry</td>
<td></td>
</tr>
<tr>
<td>Innovative Formulations Company, Satin, WB Acrylic Urethane</td>
<td>400-450</td>
<td>Drywall, plaster, concrete, most masonry surfaces, covers properly primed wood &amp; metal</td>
<td>Sheen 12-20 @ 60°, one coat, fast dry, excellent weather-ability, durability, scrub resistance, strong adhesion</td>
<td>1 hr touch</td>
<td>2 hr recoat</td>
<td>24 hr hard dry</td>
<td></td>
</tr>
<tr>
<td>Kelly-Moore Paints, 1510 Enviro-Cote Acrylic Eggshell Enamel</td>
<td>350-450</td>
<td>Wallboard, plaster, masonry surfaces in schools, hospitals, offices, institutional facilities, residential and commercial facilities</td>
<td>Sheen 7-10 @ 60°, non-polluting, anti-microbial properties, USDA acceptable</td>
<td>1 hr touch</td>
<td>4 hr recoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miller Paint Company, #1450 Series Acreo Satin</td>
<td>300-350</td>
<td>Hospital rooms, nursing homes, classrooms, kids rooms, bathrooms, kitchens</td>
<td>Antimicrobial, non-yellowing, long term durability, excellent leveling and flow</td>
<td>½ hr touch</td>
<td>4 hr recoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miller Paint Company, #4650 Series Acreo Eggshell</td>
<td>300-350</td>
<td>Hospital rooms, nursing homes, classrooms, kids rooms, bathrooms, kitchens</td>
<td>Antimicrobial, non-yellowing, long term durability, excellent leveling and flow</td>
<td>1 hr touch</td>
<td>4 hr recoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morwear Manufacturing Inc, 180-01 Satin Acrylic Wall &amp; Trim Enamel</td>
<td>300-400</td>
<td>Walls, trim, masonry, drywall, plaster, concrete, primed wood, primed metal, previously painted surfaces</td>
<td>Satin finish, superior hide, stain resistant, washable</td>
<td>½-1 hr touch</td>
<td>4 hr recoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pittsburgh Paints (PPG), 9-300 Series Pure Performance Eggshell, Acrylic Latex</td>
<td>350-400</td>
<td>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</td>
<td>Zero VOC, minimal odor, excellent hiding power, washable, anti-microbial properties, low spatter, excellent touch-up properties</td>
<td>1 hr touch</td>
<td>4 hr recoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Porter Paints (PPG), 489 Healthpro Eggshell Latex finish</td>
<td>200-400</td>
<td>Drywall, acoustical tile, plaster, primed metal, masonry, wallboard</td>
<td>Durable, high hiding, non-yellowing, low odor</td>
<td>2 hr touch</td>
<td>4 hr recoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rodda Paint Company, 5250 Horizon Satin</td>
<td>320</td>
<td>Walls and woodwork</td>
<td>Sheen 7-9 @ 60°, good resistance, low odor, enamel finish, non-toxic</td>
<td>½ hr touch</td>
<td>2 hr recoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sherwin Williams, 101.23 Harmony Styrenated Acrylic Latex Eg-Shel B9 Series</td>
<td>350-400</td>
<td>Drywall, masonry, concrete, cement, block, wood</td>
<td>Sheen 10-20 @ 85°, durable, anti-microbial</td>
<td>1 hr touch</td>
<td>4 hr recoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coating Company</td>
<td>Product Name</td>
<td>Interior/Exterior</td>
<td>VOC content (gm/l)</td>
<td>Solids (% by volume)</td>
<td>Coverage (sq ft/gal)</td>
<td>Recommended Substrate/Exposure</td>
<td>Coating Characteristics</td>
</tr>
<tr>
<td>-----------------</td>
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</tr>
<tr>
<td>Sherwin Williams</td>
<td>101.67 Latex Matte A96-100 Series</td>
<td>I</td>
<td>41</td>
<td>41</td>
<td>350-400</td>
<td>For masonry, concrete, cement, block, drywall, plaster, wood, composition board</td>
<td>Resistant to stains, scuffs, burning, smooth even finish, anti-microbial</td>
</tr>
<tr>
<td>Sierra Performance (Rust-Oleum), S-22 Wall and Trim Enamel, WB Epoxy-Acrylic Satin, 2</td>
<td>I</td>
<td>0</td>
<td>50</td>
<td>135-270</td>
<td>Properly primed doors, dry wall, concrete, wood, metal, tile</td>
<td>Excellent chemical, mildew and stain resistance, Exceptional durability, fast drying, 18 hr pot life</td>
<td>30 min touch 1-2 hr recoat</td>
</tr>
<tr>
<td>United Coatings, Acryclad 100% Acrylic Emulsion Coating</td>
<td>I/E</td>
<td>50</td>
<td>36</td>
<td>300-400</td>
<td>Wood, hardboard siding, concrete, masonry, plaster, properly primed galvanized metal, aluminum, steel and existing painted surfaces</td>
<td>Excellent adhesion, extreme UV long term resistance, flexible</td>
<td>1 hr touch 24 hr cure</td>
</tr>
<tr>
<td>Vista Paint, 6200 Carefree Earth Coat Velva Sheen, 100% Acrylic</td>
<td>E</td>
<td>8</td>
<td>37</td>
<td>350-400</td>
<td>Recommended uses include properly primed drywall, concrete, masonry, wood and metal.</td>
<td>Low VOC, odor free, exceptional hide and touch-up with superior adhesion and exterior durability.</td>
<td>1 hr touch 6 hr recoat</td>
</tr>
<tr>
<td>Vista Paint, 6300 Earth Coat Acrylic Eggshell</td>
<td>I</td>
<td>15</td>
<td>42</td>
<td>350-400</td>
<td>Interior drywall, plaster, masonry</td>
<td>Resistant to scuffing, staining and abrasion, exceptional hide, touch-up with superior adhesion</td>
<td>45 min touch 6 hr recoat</td>
</tr>
<tr>
<td>Vista Paint, MB30 Aurora Bond II Acrylic</td>
<td>I/E</td>
<td>47</td>
<td>51</td>
<td>300-350</td>
<td>Wood, plywood, drywall, masonry</td>
<td>Good durability, fade resistant</td>
<td>4 hr recoat</td>
</tr>
<tr>
<td>AllPro Corporation, 685 Ultra-Prep 100% Acrylic</td>
<td>I</td>
<td>43</td>
<td>N/A</td>
<td>500-600</td>
<td>Provides an ideal surface for wallcovering installations</td>
<td>Fast dry, superior hiding, extremely water resistant, seals chalky paint</td>
<td>1 hr recoat</td>
</tr>
<tr>
<td>American Formulating and Manufacturing MetalCoat Acrylic Metal Primer</td>
<td>I/E</td>
<td>93</td>
<td>N/A</td>
<td>300</td>
<td>Steel, galvanized iron and aluminum</td>
<td>Thermoplastic acrylic emulsion, rust inhibiting pigments, tough and flexible film, excellent adhesion, outstanding corrosion resistance</td>
<td>30 min touch 4 hr recoat</td>
</tr>
<tr>
<td>American Formulating and Manufacturing Safecoat Safe Seal, WB Acrylic</td>
<td>I</td>
<td>64</td>
<td>N/A</td>
<td>350</td>
<td>Porous surfaces such as processed wood products, concrete, wood, new drywall, grout and plaster</td>
<td>Highly effective at sealing in toxicity of underlying surface, low odor</td>
<td>1 hr touch 2 hr recoat</td>
</tr>
<tr>
<td>American Formulating and Manufacturing Safecoat Transitional Primer, WB Acrylic</td>
<td>I/E</td>
<td>22</td>
<td>N/A</td>
<td>300-350</td>
<td>Walls, ceilings, wood and wood trim, fully cured plaster, stucco, masonry and drywall</td>
<td>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</td>
<td>1 hr touch 8 hr recoat</td>
</tr>
<tr>
<td>Anchor Paint, Polaseal EFM, WB Siloxane</td>
<td>E</td>
<td>0</td>
<td>N/A</td>
<td>100-200</td>
<td>General Sealer and adheres well over old varnish, lacquer, gloss finishes, hardboard</td>
<td>Effectively seals off bleeding of water stains, ink, pencil, smoke and wood tannins, good abrasion, flexibility and weather resistance</td>
<td>30 min touch 1 hr recoat</td>
</tr>
<tr>
<td>Benjamin Moore, 216 Regal FirstCoat Latex Primer &amp; Underbody</td>
<td>I</td>
<td>100</td>
<td>27</td>
<td>400-500</td>
<td>Wallboard, cured plaster, trim, galvanized metal, and masonry surfaces</td>
<td>Rapid drying, spatter resistant, excellent holdout and hiding qualities</td>
<td>1 hr touch 1 hr recoat</td>
</tr>
<tr>
<td>Benjamin Moore, 231 Pristine Eco Spec 100% Acrylic Latex Primer/Sealer</td>
<td>I</td>
<td>50</td>
<td>30</td>
<td>550</td>
<td>New or previously painted drywall, composition board, wood, concrete, plaster, and other porous surfaces</td>
<td>Spatter-resistant, exhibits excellent holdout properties</td>
<td>30 min touch 1 hr recoat</td>
</tr>
<tr>
<td>Company</td>
<td>Type</td>
<td>I/E</td>
<td>V/O</td>
<td>Min/Max</td>
<td>Product Description</td>
<td>Application</td>
<td>Touch Time</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-----------------------------</td>
<td>-----</td>
<td>-----</td>
<td>---------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>ChemMasters, Chemisl, WB Clear liquid Sodium Silicate Sealer/Hardner</td>
<td>I/E</td>
<td>0</td>
<td>N/A</td>
<td>200-600</td>
<td>For concrete surfaces, horizontal or vertical applications, floor slabs, formed and poured walls, curing agent for surfaces scheduled to receive subsequent treatments.</td>
<td>Seals, hardens and dustprooﬁns in one operation, no odor, compatible with most adhesives, increases resistance to penetration of liquids and oils.</td>
<td>½ to 1 hr</td>
</tr>
<tr>
<td>ChemMasters, ColorCoat, 100% Acrylic</td>
<td>I/E</td>
<td>51</td>
<td>60</td>
<td>150-200</td>
<td>For vertical and overhead concrete masonry, brick or stucco, formed walls.</td>
<td>Excellent adhesion and weathering properties, superior moisture vapor transmission, protects against airborne dirt and pollutants, non-yellowing and fade resistant.</td>
<td>2-4 hr recoat</td>
</tr>
<tr>
<td>ChemMasters, Polyseal WB Acrylic</td>
<td>I/E</td>
<td>82</td>
<td>25</td>
<td>300-400</td>
<td>Use to seal and dustproof older interior or exterior concrete, enhance the color and provide uniform appearance of dry shake hardened floors.</td>
<td>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.</td>
<td>2 hr</td>
</tr>
<tr>
<td>Cloverdale Paint, 20100 Towerthon Plus Elastomeric Coating</td>
<td>E</td>
<td>75</td>
<td>50</td>
<td>54-67</td>
<td>For masonry, stucco, concrete, prepared vinyl and aluminum siding and properly primed metal and new wood surfaces.</td>
<td>Excellent elongation properties, even at low temperatures, for hairline or cracked surfaces. Dries to an attractive satin sheen.</td>
<td>18 hr touch</td>
</tr>
<tr>
<td>Cloverdale Paint, 90700 Horizon Interior Drywall Sealer, Vinyl Acrylic Latex</td>
<td>I</td>
<td>1</td>
<td>27</td>
<td>216-288</td>
<td>For schools, hospitals, nursing homes, ofﬁces and other smell-sensitive areas on drywall, plaster, textured ceilings, wallboard, ﬁberboard, and hardboard.</td>
<td>Low odor, ﬂat</td>
<td>30 min tackfree</td>
</tr>
<tr>
<td>Color Wheel Paints &amp; Coatings, 430 Ti-Guard Vinyl Acrylic Sealer Flat</td>
<td>I</td>
<td>98</td>
<td>29</td>
<td>300-500</td>
<td>Wall board, plaster, masonry, stucco, wood, plywood acoustical ceiling tiles</td>
<td>Outstanding resistance to blistering, cracking, chipping, peeling, excellent adhesion, rapid dry, good enamel holdout</td>
<td>1 hr</td>
</tr>
<tr>
<td>Color Wheel Paints &amp; Coatings, 1250 Ti-Gard Latex Conditioner, Acrylic</td>
<td>I/E</td>
<td>75</td>
<td>20</td>
<td>300-500</td>
<td>Previously painted masonry, stucco, plaster, wood, ferrous metals, aluminum and galvanized metals</td>
<td>Remarkable resistance to blistering, cracking, chipping, peeling, excellent adhesion, low odor, rapid dry</td>
<td>1 hr</td>
</tr>
<tr>
<td>Columbia Paint &amp; Coatings, 02-728 Prime Time Drywall Undercoater, Vinyl Acrylic Latex</td>
<td>I</td>
<td>21</td>
<td>29</td>
<td>360</td>
<td>For use as a base coat over prepared drywall and as a primer prior to texture application.</td>
<td>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.</td>
<td>½-1 hr recoat</td>
</tr>
<tr>
<td>Columbia Paint &amp; Coatings, 05-564 SureGrip Low Odor Primer Styrene Acrylic Latex</td>
<td>I/E</td>
<td>84</td>
<td>41</td>
<td>360</td>
<td>Previously painted rough and smooth siding, wood, hardboard, masonry, concrete, stucco, properly prepared galvanized metal, drywall</td>
<td>Stain blocker, reduces face checking</td>
<td>1 hr</td>
</tr>
<tr>
<td>Columbia Paint &amp; Coatings, 05-574 Purecoat Low Odor Primer Vinyl Acrylic Latex</td>
<td>I</td>
<td>0</td>
<td>36</td>
<td>360</td>
<td>Drywall, plaster, masonry, and non-bleeding woods</td>
<td>Offers high hiding, excellent enamel holdout, minimizes variations in ﬁnish coats</td>
<td>1 hr</td>
</tr>
<tr>
<td>Columbia Paint &amp; Coatings, 05-700 Hi-Performance Perma-Flex Bonding Primer/Sealer Styrene Acrylic Latex</td>
<td>I/E</td>
<td>6</td>
<td>27</td>
<td>400</td>
<td>previously painted rough and smooth siding, wood, hardboard, masonry, concrete, stucco, properly prepared galvanized metal, wallboard</td>
<td>Flexible bridging sealer for unsound surfaces, provides permeability and ﬂexibility, excellent adhesion, quick drying, stain blocking</td>
<td>5-1 hr recoat</td>
</tr>
<tr>
<td>Coronado Paints, 1240-11 Air Care Odorless Primer</td>
<td>I</td>
<td>0</td>
<td>34</td>
<td>450</td>
<td>Drywall, plaster, smooth masonry</td>
<td>flows easily, excellent hiding power</td>
<td>30 min touch</td>
</tr>
<tr>
<td>Coronado Paints, 147-10 Rust-Grip Penetrating Epoxy Sealer 2</td>
<td>I/E</td>
<td>12</td>
<td>98</td>
<td>600-800</td>
<td>Apply over old paint, tight rust, mill scale, used as a primer for non-ferrous metals including galvanized steel</td>
<td>penetrates rust, corrosion inhibitors, improves adhesive integrity of old coatings</td>
<td>24 hr recoat</td>
</tr>
<tr>
<td>Diamond Vogel Paints, BU-1501, 1502 Series Sure Grip Acrylic Latex Primer</td>
<td>E</td>
<td>95</td>
<td>38</td>
<td>305-407</td>
<td>Wood, hardboard, aluminum, masonry</td>
<td>Outstanding adhesion, stain blocking</td>
<td>½-2 hr recoat</td>
</tr>
<tr>
<td>Diamond Vogel Paints, DU-1508 Latex Undercoater</td>
<td>I</td>
<td>56</td>
<td>32</td>
<td>344-516</td>
<td>Bare Interior Wood Surfaces</td>
<td>Excellent hold out, sands easily, smooth leveling</td>
<td>½-1 hr recoat</td>
</tr>
<tr>
<td>Diamond Vogel Paints, DU-1520 Latex Primer/Surfacer</td>
<td>I</td>
<td>58</td>
<td>30</td>
<td>160-240</td>
<td>For sealing walls and ceilings</td>
<td>Excellent hold out</td>
<td>1 hr recoat</td>
</tr>
<tr>
<td>Company</td>
<td>Product Name</td>
<td>Code</td>
<td>Use</td>
<td>Description</td>
<td>Dry</td>
<td>Recoat</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
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</tr>
<tr>
<td>Diamond Vogel Paints,</td>
<td>MC Series, V-Cote 200 Acrylic Maintenance Primer/Finish</td>
<td>I/E 91 39 209-313</td>
<td>Bare or previously painted steel, galvanized metal, wood, aluminum, masonry</td>
<td>Outstanding adhesion, corrosion inhibitors, non-yellowing, excellent durability and fade resistance</td>
<td>½-2 hr</td>
<td>2-4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Dunn Edwards,</td>
<td>W 101 Vinylastic Pigmented Sealer</td>
<td>I 60 29-36 250-400</td>
<td>New drywall and skim-coated drywall</td>
<td>Dries fast, excellent hiding, adhesion, and enamel holdout</td>
<td>½-1 hr</td>
<td>2-4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Dunn Edwards,</td>
<td>W 102 Proseal Pigmented Sealer</td>
<td>I 55 30 250-300</td>
<td>Drywall</td>
<td>Dries fast, enamel holdout</td>
<td>1 hr</td>
<td>2-4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Dunn Edwards,</td>
<td>W 500 Sierra Sealer/Undercoater</td>
<td>I 0 38 300-400</td>
<td>Drywall, masonry, wood, hardboard</td>
<td>Good hide, adhesion, &amp; enamel holdout</td>
<td>1 hr</td>
<td>2-4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Dunn Edwards,</td>
<td>W 600 Ecoshield Low-Odor Latex, Modified Copolymer</td>
<td>I 10 36 300-350</td>
<td>For residential, commercial office buildings, schools, hospitals, and other closed ventilated buildings on drywall, masonry, wood, synthetic wood, metal</td>
<td>Very good hide, adhesion and enamel holdout.</td>
<td>30-60 min</td>
<td>2-4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Dunn Edwards,</td>
<td>W 715 Ultra Grip Multi-Purpose Primer WB 100% Acrylic</td>
<td>I/E 45 39 400</td>
<td>Wood, fiberglass, anodized aluminum, some plastics</td>
<td>Outstanding stain blocking, excellent enamel holdout, great hide, adheres well to aged alkyls and waterborne enamels</td>
<td>1 hr</td>
<td>2-4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Dunn Edwards,</td>
<td>W 2400 Latex Enamel Undercoater WB Acrylic Copolymer</td>
<td>I 80 38 400</td>
<td>wood, synthetic wood, hardboard</td>
<td>Good hide, adhesion &amp; enamel hold out</td>
<td>1 hr</td>
<td>2-4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Dunn Edwards,</td>
<td>W 6315 Flex-Prime, Flexible Crack-Resistant Primer</td>
<td>I/E 75 41 100-250</td>
<td>Designed to bridge hairline cracks in masonry surfaces resulting in a seal that is highly flexible and allows for movement in the substrate.</td>
<td>A quality masonry primer formulated to provide excellent flexibility and resistance to efflorescence and alkali.</td>
<td>30-60 min</td>
<td>2-4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Duron Paints &amp; Wallcoverings,</td>
<td>08-124 Bond-N-Seal Acrylic Latiex Primer</td>
<td>E 90 35 400</td>
<td>For exterior priming of uncoated and factory primed hardboard siding, composite and synthetic substrates, cured unpainted masonry.</td>
<td>Excellent adhesion to new and many repainting surfaces, dries fast, resists minor tannic acid bleed, peeling, blistering, mildew.</td>
<td>1 hr</td>
<td>4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Duron Paints &amp; Wallcoverings,</td>
<td>08-129 Siding in a Can Acrylic Primer</td>
<td>E 94 35 400</td>
<td>Primer for factory finished steel, aluminum and vinyl siding, hardboard and composite siding, plywood, masonry, galvanized metal</td>
<td>Resists peeling, blistering mildew, tannic acid bleed, excellent adhesion, dries fast</td>
<td>1 hr</td>
<td>4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Duron Paints &amp; Wallcoverings,</td>
<td>71-218 Terminator 2 WB Stain Killer, Acrylic</td>
<td>I/E 13 36 350</td>
<td>Drywall, aluminum siding, galvanized metal, fiberglass, glossy paint, wood, poured masonry, vinyl siding</td>
<td>Seals porous surfaces, prevents stains, outstanding adhesion for glossy paints</td>
<td>20-30 min</td>
<td>1 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Duron Paints &amp; Wallcoverings,</td>
<td>8-124 Bond-N-Seal Acrylic Latiex Primer</td>
<td>E 90 35 400</td>
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<td>Excellent adhesion to new and many repainting surfaces, dries fast, resists minor tannic acid bleed, peeling, blistering, mildew.</td>
<td>1 hr</td>
<td>4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Duron Paints &amp; Wallcoverings,</td>
<td>08-129 Siding in a Can Acrylic Primer</td>
<td>E 94 35 400</td>
<td>Primer for factory finished steel, aluminum and vinyl siding, hardboard and composite siding, plywood, masonry, galvanized metal</td>
<td>Resists peeling, blistering mildew, tannic acid bleed, excellent adhesion, dries fast</td>
<td>1 hr</td>
<td>4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Duron Paints &amp; Wallcoverings,</td>
<td>71-218 Terminator 2 WB Stain Killer, Acrylic</td>
<td>I/E 13 36 350</td>
<td>Drywall, aluminum siding, galvanized metal, fiberglass, glossy paint, wood, poured masonry, vinyl siding</td>
<td>Seals porous surfaces, prevents stains, outstanding adhesion for glossy paints</td>
<td>20-30 min</td>
<td>1 hr recoat</td>
<td></td>
</tr>
<tr>
<td>EPMAR</td>
<td>Kemiko Clear WB Acrylic Urethane Sealer</td>
<td>I/E 0 30 300-400</td>
<td>Clear sealer on bare cement/plaster, wood and other composite surfaces</td>
<td>UV, abrasion and stain resistant, excellent leveling and flow properties</td>
<td>30 min</td>
<td>1 hr recoat</td>
<td></td>
</tr>
<tr>
<td>EVR-Gard Coatings,</td>
<td>63 Unikote Latex Enamel Undercoat</td>
<td>I/E 97 37 300-400</td>
<td>Wood, masonite, drywall</td>
<td>Extremely tough, good enamel holdout and adhesion, maximum hiding power</td>
<td>1 hr</td>
<td>4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>EVR-Gard Coatings,</td>
<td>103 Evrare Primer Sealer, Vinyl-Acrylic</td>
<td>I/E 97 37 300-400</td>
<td>Properly prepared or previously painted wall-board, wood, metal and masonry</td>
<td>Excellent hiding power</td>
<td>1 hr</td>
<td>4-6 hr recoat</td>
<td></td>
</tr>
<tr>
<td>EVR-Gard Coatings,</td>
<td>64 Quick Dry Latex Enamel Undercoat</td>
<td>I 61 40 300-350</td>
<td>Nearly all interior surfaces</td>
<td>Good adhesion</td>
<td>1 hr</td>
<td>2 hr recoat</td>
<td></td>
</tr>
<tr>
<td>EVR-Gard Coatings,</td>
<td>95 Busan Vinyl Acrylic Wood &amp; Metal Primer</td>
<td>I/E 76 38 300-400</td>
<td>Wood, masonite, non-ferrous metals</td>
<td>Retards bleed through of tannins and resins in redwood, cedar and fir</td>
<td>1 hr</td>
<td>4-5 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Farwest</td>
<td>X-6785 Aquashield II Fast Dry Red Oxide Waterborne Shop Primer</td>
<td>I/E 76 38 300-400</td>
<td>Metal Surfaces</td>
<td>Water and corrosion resistant film</td>
<td>30-45 min</td>
<td>1-3 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Farwest, #5030 Block Filler Acrylic Latex Emulsion</td>
<td>I/E</td>
<td>25</td>
<td>27</td>
<td>100-150</td>
<td>Cement walls, cinder block</td>
<td>Heavy viscosity pigmented emulsion to fill pinholes on wall surfaces to withstand moisture and water leaks</td>
<td>1 hr touch 18 hr recoat</td>
</tr>
<tr>
<td>Farwest, #5085 Latex Acrylic Primer</td>
<td>E</td>
<td>46</td>
<td>33</td>
<td>200-400</td>
<td>Exterior wood and masonry surfaces</td>
<td>Good blocking resistance, adheres well to wood and masonry, fast dry, breathable film</td>
<td>1 hr touch 2-4 hr recoat</td>
</tr>
<tr>
<td>Farwest, #700 Wonderblok Stain Blocker Fast-Dry Acrylic Primer Sealer</td>
<td>I/E</td>
<td>82</td>
<td>41</td>
<td>300-400</td>
<td>Wallboard, ceramic tile, hardboard, plastic laminate, metal surfaces</td>
<td>Blocks out water, stains, smoke stains, felt tip pen, crayons, breathable film</td>
<td>30-40 min touch 2 hr recoat</td>
</tr>
<tr>
<td>Farwest, #970 Poroseal PVA Primer Sealer Pigmented Flat Latex Emulsion</td>
<td>I</td>
<td>27</td>
<td>31</td>
<td>300-500</td>
<td>Wallboard, cement block, plaster or brick surfaces</td>
<td>Good emulsion</td>
<td>30 min touch 1-3 hr recoat</td>
</tr>
<tr>
<td>Farwest, X-6791 Aquashield II, Waterborne Rust-Inhibitive Primer</td>
<td>E</td>
<td>76</td>
<td>38</td>
<td>300-400</td>
<td>Metal Surfaces</td>
<td>Fast drying, water and corrosion resistant film</td>
<td>30-45 min touch 1-3 hr recoat</td>
</tr>
<tr>
<td>Fine Paints of Europe, Eurolax Acrylic Primer/Undercoat</td>
<td>I</td>
<td>100</td>
<td>N/A</td>
<td>424</td>
<td>Walls, ceilings, and woodwork</td>
<td>Flows easily and spreads quickly</td>
<td>1 hr touch 4 hr recoat</td>
</tr>
<tr>
<td>Flex Bon Paints, 107 Series, Premium Acrylic Primer</td>
<td>I</td>
<td>75</td>
<td>29</td>
<td>450</td>
<td>Drywall, plaster, concrete, masonry, and stucco. May be applied to wood</td>
<td>Alkali resistant, good adhesion, good hold-out of sheen finishes</td>
<td>½ hr touch 4-6 hr recoat</td>
</tr>
<tr>
<td>Flex Bon Paints, 194 Series, Premium Acrylic Primer</td>
<td>I/E</td>
<td>70</td>
<td>39</td>
<td>400</td>
<td>Concrete, masonry, stucco, wood, steel, galvanized metal, aluminum, asbestos siding, plaster or hardcoat</td>
<td>Alkali resistant, good stain blocking, flash rust resistant</td>
<td>2-4 hr touch 18 hr recoat</td>
</tr>
<tr>
<td>Frazee Paint (PPI), 065 Acry-Prime Acrylic Undercoater</td>
<td>I/E</td>
<td>86</td>
<td>37</td>
<td>200-400</td>
<td>Concrete, masonry, wood, hardboard, non-ferrous metals, plaster, drywall</td>
<td>Excellent quality, fast drying, high hiding</td>
<td>30-60 min touch 3-4 hr recoat</td>
</tr>
<tr>
<td>Frazee Paint (PPI), 906 Envirokote Acrylic Copolymer Primer</td>
<td>I</td>
<td>4</td>
<td>42</td>
<td>100-400</td>
<td>Concrete, masonry, drywall, plaster, hardboard, metal, wood</td>
<td>Top of the line quality</td>
<td>1 hr touch 2-3 hr recoat</td>
</tr>
<tr>
<td>Frazee Paint (PPI), 168 Prime Plus Acrylic Primer/Undercoater</td>
<td>I/E</td>
<td>60</td>
<td>45</td>
<td>200-400</td>
<td>Concrete/masonry, drywall, plaster, metal, wood</td>
<td>Resists alkali on concrete and masonry, not for use on floors</td>
<td>1 hr touch 2-3 hr recoat 7 day cure</td>
</tr>
<tr>
<td>Frazee Paint (PPI), 172 Grip-N-Seal Acrylic All Purpose Primer</td>
<td>I/E</td>
<td>96-98</td>
<td>33</td>
<td>100-350</td>
<td>Concrete/masonry, drywall, plaster, metal, wood</td>
<td>Excellent adhesion, blocks stains and tannin bleed</td>
<td>1 hr touch 2-3 hr recoat 7 day cure</td>
</tr>
<tr>
<td>Frazee Paint (PPI), 266 Epoxy-Acryl Primer</td>
<td>E</td>
<td>80</td>
<td>40</td>
<td>100-350</td>
<td>Block, concrete</td>
<td>Exceptional adhesion, resists alkali</td>
<td>4-8 hr touch 12 hr recoat</td>
</tr>
<tr>
<td>Fuhr International, 5400 ZVOC Wax Seal &amp; Finish</td>
<td>I/E</td>
<td>0</td>
<td>32</td>
<td>350-450</td>
<td>Wood Substrates</td>
<td>Fast dry, excellent durability, early block resistance, anti-sag formulation, self-sealing</td>
<td>5 min touch 20 min sand</td>
</tr>
<tr>
<td>General Paint (PPI), 60-200 X-Terminator 2, Acrylic</td>
<td>I/E</td>
<td>60</td>
<td>N/A</td>
<td>Drywall, plaster, hardboard, wood, previously painted</td>
<td>Prevents bleedthrough of smoke, water, grease, lipstick, crayon, felt marker and graffiti stains, excellent adhesion</td>
<td>40 min touch 60 min handle 2 hr recoat</td>
<td></td>
</tr>
<tr>
<td>General Paint (PPI), 70-002 Latex Primer</td>
<td>E</td>
<td>76</td>
<td>44</td>
<td>350-470</td>
<td>New or previously painted wood</td>
<td>Unique penetrating properties, contains stain blocking pigments and fungicidal agent</td>
<td>15-30 min touch 2 hr handle 4 hr recoat</td>
</tr>
<tr>
<td>Glitsa American Inc, 27-0043 Infinity Color Control Sealer</td>
<td>I</td>
<td>85</td>
<td>N/A</td>
<td>500</td>
<td>Wood Floors</td>
<td>Fast drying, acrylic resin</td>
<td>1-3 hr recoat</td>
</tr>
<tr>
<td>Hallman Lindsay Quality Paints, 112 Primeguard, Alkyd-Modified Acrylic Primer</td>
<td>E</td>
<td>30</td>
<td>35</td>
<td>400</td>
<td>New and previously painted surfaces such as wood, hardboard siding, plaster, stucco and masonry</td>
<td>Excellent sealing and adhesion properties, flexible and outstanding lister and mildew resistance</td>
<td>1 hr touch 6-8 hr recoat</td>
</tr>
<tr>
<td>Hallman Lindsay Quality Paints, 526 Stainguard 100% Acrylic</td>
<td>I/E</td>
<td>80</td>
<td>36</td>
<td>400</td>
<td>Wood, plaster, drywall, hardboard, masonry, fire-damaged walls, ceiling, and trim, acoustical ceiling tiles, new and previously painted surfaces</td>
<td>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</td>
<td>30-40 min touch 1 hr recoat</td>
</tr>
<tr>
<td>ICI Paints (Devore), DRH6400 Hydroprime WB Acrylic Penetrating Sealer</td>
<td>I/E</td>
<td>58</td>
<td>30</td>
<td>250-400</td>
<td>To seal and prepare new and old concrete, stucco, precast concrete or previously painted wood, concrete or metal surfaces</td>
<td>Excellent penetration, strengthens masonry surfaces, promotes adhesion</td>
<td>1 hr touch 4 hr recoat</td>
</tr>
<tr>
<td>Company</td>
<td>Product Name</td>
<td>Application &amp; Description</td>
<td>Hide/Adhesion/Barrier Properties</td>
<td>User Instructions</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Ideal Paints (PPI),</td>
<td>2070 Acrylic Stain Blocking Primer</td>
<td>Wood, masonry, galvanized metal</td>
<td>Stain blocking, Excellent adhesion to glossy and galvanized surfaces, flash rust resistant</td>
<td>1 hr touch 10 hr cure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ideal Paints (PPI),</td>
<td>7500 Vinyl Acrylic Latex Primer/Sealer</td>
<td>Drywall, cured plaster</td>
<td>Good hiding, excellent enamel holdout, fast dry, low odor</td>
<td>30 min touch 2-4 hr hard dry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kelly-Moore Paints,</td>
<td>95-25 Pre-Cote Wallboard Primer/Sealer</td>
<td>Wallboard and plaster for commercial or residential application</td>
<td>Minimizes joint banding, excellent for critical light areas, equalizes surface porosity</td>
<td>1 hr touch 4 hr recoat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kelly-Moore Paints,</td>
<td>971 Acry-Plex Interior PVA Primer/Sealer</td>
<td>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.</td>
<td>Excellent enamel holdout, uniforms surface, high hide, easy application, fast drying, minimal odor and VOC, easy soap and water cleanup.</td>
<td>1 hr touch 4 hr recoat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kelly-Moore Paints,</td>
<td>1505 Enviro-Cote PVA Primer/Sealer</td>
<td>Wallboard, concrete, and cured plaster for residential or commercial application</td>
<td>Equalizes porosity, develops a uniform surface, excellent enamel holdout, high hide, fast drying</td>
<td>1 hr touch 4 hr recoat</td>
<td></td>
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</tr>
<tr>
<td>KST Coatings, LLC (Thorlo),</td>
<td>Prime A Deck, Acrylic Latex</td>
<td>Roof, walls and decks made from wood, concrete, metal, asphalt, fiberglass, aged tar, rolled roofing masonry, stucco, gutters</td>
<td>Waterproof's 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</td>
<td>N/A</td>
<td></td>
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</tr>
<tr>
<td>Kwal Paint (PPI),</td>
<td>0830 Environkote Latex Primer/Sealer</td>
<td>Drywall, plaster, concrete, insulation, previously painted or primed metal</td>
<td>Fast drying, alkali resistant, may be topcoated with most conventional latex or alkyd based products</td>
<td>1 hr dust free 4 hr recoat</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Kwal Paint (PPI),</td>
<td>0875 FDC Drywall Primer, Vinyl Emulsion</td>
<td>New drywall and woodwork</td>
<td>Formulated for use under either alkyd or latex products, excellent sanding and sealer properties,</td>
<td>1 hr dust free 4 hr may be sanded</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kwal Paint (PPI),</td>
<td>890 Sandable Drywall Primer, Vinyl Emulsion</td>
<td>Specifically formulated for use under eggshell, satin, semi-gloss, or gloss paints.</td>
<td>Excellent sanding and sealing. Ideal product for prepping and sealing smooth finished drywall work.</td>
<td>1 hr dust free 4 hr recoat</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Kwal Paint (PPI),</td>
<td>5860 All Purpose Primer/Undercoat, 100% Acrylic Emulsion</td>
<td>Wood, concrete, plastic, hardboard, drywall and cement</td>
<td>Alkali Resistant, breathable, flexible, fast drying, excellent adhesion to properly prepared surfaces</td>
<td>1 hr dust free 4 hr recoat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kwal Paint (PPI),</td>
<td>5862 Cancel Sand Acrylic Primer</td>
<td>Specially formulated to sand quickly.</td>
<td>A water reducible, alkali resistant, fast-drying primer. May be topcoated with most finishes, water or solvent-reduced</td>
<td>1 hr dust free 4 hr recoat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing &amp; Consulting Chemists Inc, M-3XXX Series Pigmented Concrete and Masonary Acrylic Sealer</td>
<td></td>
<td>Concrete and masonry including blocks, bricks, and tiles</td>
<td>Excellent clarity, fast dry</td>
<td>30 min touch 1 hr recoat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Martin Senour, 30-1185 T P S Latex</td>
<td></td>
<td>Walls and ceilings made from drywall, wallboard, masonry</td>
<td>Seals to provide a non-porous surface, sands smoothly, can be used under latex, oil, or alkyd paints</td>
<td>1 hr touch 3-4 hr recoat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Martin Senour, 71-1001 Pro Line Premium Latex</td>
<td></td>
<td>Walls and ceilings made from drywall, wallboard, masonry</td>
<td>Seals porous surfaces promoting topcoat adhesion, resists raising paper fibers, good for spot priming and covering dark colored surfaces, sands smoothly</td>
<td>1 hr touch 3-4 hr recoat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miller Paint Company, #1545 Moisture Vapor Barrier Primer</td>
<td></td>
<td>Wallboard and plaster surfaces</td>
<td>Moisture vapor barrier preventing moisture migration into wall insulation</td>
<td>1 hr touch 3 hr recoat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minuteman Intl. (Multi-Clean), Court Shield First Round</td>
<td></td>
<td>Wood Floors</td>
<td>Helps prevent side bonding on tongue and groove flooring, penetrates, non-yellowing, dries quickly</td>
<td>2 hr recoat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morwear Manufacturing Inc, 1877 PVA Acrylic High Build Primer</td>
<td></td>
<td>Plaster, concrete, brick, acoustical tile and all types of drywall</td>
<td>Extra hide, quick drying, excellent enamel holdout</td>
<td>½-1 hr touch 4 hr recoat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Model Number</td>
<td>Type</td>
<td>Coverage</td>
<td>Application Notes</td>
<td>Adhesive Properties</td>
<td>Dry Time</td>
<td>Recoat Time</td>
</tr>
<tr>
<td>--------------------------------------</td>
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</tr>
<tr>
<td>Morwear Manufacturing Inc,</td>
<td>E 98</td>
<td>31 300-400</td>
<td>Stucco, tilt-up, poured concrete, brick, concrete block, galvanized metal</td>
<td>Excellent adhesion, alkali resistant, good tannin stain blocking, very good enamel holdout</td>
<td>30 min touch 4 hr reccoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Para Paints,</td>
<td>I 87</td>
<td>N/A 400-450</td>
<td>For drywall, dry plaster or previously painted porous surfaces. Can be used as an undercoater on wood trim such as baseboards and doors</td>
<td>A high hiding sealer 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.</td>
<td>30 min touch 4-6 hr reccoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parker Paint CGI,</td>
<td>I/E 75</td>
<td>45 490</td>
<td>Typical uses include galvanized iron and aluminum. Designed for use with waterborne finish coatings.</td>
<td>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. Quality highly pigmented primer sealer. Can be applied before or after texturing is applied.</td>
<td>2 hr tack free 6 hr reccoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parker Paint CGI,</td>
<td>I 34</td>
<td>30 350</td>
<td>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.</td>
<td>Alkali resistant cementitious primer.</td>
<td>1 hr tack free 4 hr reccoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pittsburgh Paints (PPG),</td>
<td>I 98</td>
<td>28 350-450</td>
<td>Can be used as a primer under finish coats of oil, alkdy 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.</td>
<td>Excellent adhesion and sealing properties, easy application, fast drying, soap and water clean-up.</td>
<td>10 min touch 4 hr reccoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pratt &amp; Lambert Paints,</td>
<td>E 100</td>
<td>30 400</td>
<td>Designed for use on exterior wood and plywood siding and trim.</td>
<td>Enhances the durability of topcoats and offers superior adhesion to wood, exceptional tannin stain resistance and spatter less.</td>
<td>30 min touch 4 hr reccoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pratt &amp; Lambert Paints,</td>
<td>I 100</td>
<td>28 400</td>
<td>Formulated to promote peak performance of latex or alkdy wall paints. Recommended for interior drywall, plaster, masonry, canvas and other porous, spackled or patched surfaces.</td>
<td>Fast drying and provides excellent hiding, holdout and spatterless application.</td>
<td>30 min touch 4 hr reccoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rodda Paint Company,</td>
<td>I 44-87</td>
<td>28 300-325</td>
<td>Primer under oil type, emulsion paints</td>
<td>Very fast drying, non-toxic,</td>
<td>½ hr touch 2-3 hr reccoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rodda Paint Company,</td>
<td>I 6</td>
<td>27 230</td>
<td>Wall primer</td>
<td>Moderate resistance, non-toxic, self priming</td>
<td>½ hr touch 2-3 hr reccoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rodda Paint Company,</td>
<td>I/E 19</td>
<td>38 300</td>
<td>New, unpainted, concrete, stucco, masonry, drywall, or hardboard</td>
<td>Resistance good, non-toxic</td>
<td>1 hr touch 3 hr reccoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rodda Paint Company,</td>
<td>I 87</td>
<td>39 330</td>
<td>Primer under alkdy or emulsion finishes on drywall</td>
<td>Excellent hold-out, non-toxic</td>
<td>½ hr touch 2-3 hr reccoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roman Decorating Products,</td>
<td>I 50</td>
<td>37 550</td>
<td>Excellent for priming bare drywall, can be tinted</td>
<td>Replacement for oil/alkyd based primers</td>
<td>1 hr reccoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seal-Krete Inc,</td>
<td>I/E 0</td>
<td>5 200-300</td>
<td>Horizontal concrete surfaces such as driveways, sidewalks, porches and patios</td>
<td>Keeps water from penetrating, protects against spalling, pockmarking and road salts, maximum durability</td>
<td>15-60 min touch no reccoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sherwin Williams,</td>
<td>I 86</td>
<td>28 400</td>
<td>Drywall, masonry, concrete, previously painted surfaces</td>
<td>Excellent coverage, excellent drywall sealer</td>
<td>1 hr touch 4 hr reccoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sherwin Williams,</td>
<td>I 61</td>
<td>29 350-400</td>
<td>Drywall, masonry, concrete, previously painted surfaces</td>
<td>Good drywall sealer</td>
<td>1 hr touch 4 hr reccoat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sherwin Williams,</td>
<td>I 108.01</td>
<td>280 400</td>
<td>Vinyl Acrylic Latex B58200</td>
<td>Drywall, masonry, concrete, previously painted surfaces</td>
<td>Excellent coverage, excellent drywall sealer</td>
<td>1 hr touch 4 hr reccoat</td>
<td></td>
</tr>
<tr>
<td>Sherwin Williams,</td>
<td>I 108.02</td>
<td>400 400</td>
<td>Vinyl Acrylic Latex B28W400</td>
<td>Drywall, masonry, concrete, previously painted surfaces</td>
<td>Good drywall sealer</td>
<td>1 hr touch 4 hr reccoat</td>
<td></td>
</tr>
<tr>
<td>Sherwin Williams, 108.04 PrepRite ProBlock Acrylic Latex Primer Sealer B51 Series</td>
<td>I/E</td>
<td>73</td>
<td>36</td>
<td>400</td>
<td>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.</td>
<td>Assures uniform appearance of topcoats, fast dry, use on interior or exterior.</td>
<td>30 min touch 1 hr recoat/primer 4 hr recoat/sealer</td>
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<tr>
<td>Sherwin Williams, 108.08 PrepRite High Build Vinyl Acrylic Latex B28W601</td>
<td>I</td>
<td>71</td>
<td>23</td>
<td>400</td>
<td>Drywall, cured plaster, under decorative texture finishes</td>
<td>Ensures coat will be smooth, minimizes minor surface imperfections</td>
<td>1 hr touch 4 hr recoat</td>
</tr>
<tr>
<td>Sherwin Williams, 108.10 A-100 Acrylic Latex Primer</td>
<td>E</td>
<td>89</td>
<td>36</td>
<td>350-400</td>
<td>Wood, plywood, cement, stucco, composition board, cement composition panels, spot primer</td>
<td>Mildew Resistant, low temperature</td>
<td>1-2 hr touch 4-48 hr recoat</td>
</tr>
<tr>
<td>Sherwin Williams, 108.15 Harmony Latex Primer B11W900</td>
<td>I</td>
<td>0</td>
<td>33</td>
<td>350-400</td>
<td>Drywall, masonry, concrete, cement block, plaster</td>
<td>Anti-microbial, very low odor, formulated without silica</td>
<td>1 hr touch 4 hr recoat</td>
</tr>
<tr>
<td>Sherwin Williams, 108.16 Color-Prime Vinyl Acrylic Latex Deep Tinting Base</td>
<td>I</td>
<td>95</td>
<td>26</td>
<td>350-400</td>
<td>Drywall, masonry, concrete, cured plaster, previously painted surfaces</td>
<td>Excellent hiding primer, excellent coverage, excellent drywall sealer</td>
<td>1 hr touch 4 hr recoat</td>
</tr>
<tr>
<td>Sherwin Williams, 108.17 Moisture Vapor Barrier B72W1, Vinyl Acrylic/Styrene Butadiene</td>
<td>I</td>
<td>32</td>
<td>N/A</td>
<td>200-250</td>
<td>drywall</td>
<td>Reduces loss of moisture</td>
<td>1 hr touch 4 hr recoat</td>
</tr>
<tr>
<td>Sherwin Williams, 108.21 PrepRite Bonding Primer B51W50, Acrylic Adhesion Promoting Primer</td>
<td>I/E</td>
<td>41</td>
<td>42</td>
<td>350-400</td>
<td>Aluminum, copper, drywall, tile, glass, concrete, masonry, fiberglass, plastic, PVC, procelain</td>
<td>Excellent adhesion, does not contain rust inhibitors</td>
<td>40 min touch 4 hr recoat</td>
</tr>
<tr>
<td>Superior Environmental Products, SC-2100 NoveFloor</td>
<td>I</td>
<td>0</td>
<td>100</td>
<td>160</td>
<td>Shop, garage, semiconductor, or warehouse floor</td>
<td>Excellent Chemical and heat resistance, excellent wear resistance</td>
<td>1-5 hr recoat 7 day cure</td>
</tr>
<tr>
<td>Tamms Industries, Clearseal WB 150 Acrylic (Low Sheen) Clearseal WB STD Acrylic (Med. Sheen) Clearseal WB 300 Acrylic (Gloss)</td>
<td>I/E</td>
<td>&lt;50</td>
<td>N/A</td>
<td>150-400</td>
<td>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.</td>
<td>Low viscosity, penetrating cure, sealer and hardener. Water based concrete cure and seal, one component.</td>
<td>2-4 hr recoat</td>
</tr>
<tr>
<td>Van Technologies, Inc 200WP-Van Aqua WB White Primer</td>
<td>I/E</td>
<td>74</td>
<td>N/A</td>
<td>N/A</td>
<td>Wood, works with a wide variety of topcoats including solvent based</td>
<td>Minimizes grain raise, dries fast, spray, brush or roller application</td>
<td>10-15 min dry</td>
</tr>
<tr>
<td>Van Technologies, Inc 244BLK-Van Aqua WB Black Primer/Sealer</td>
<td>I/E</td>
<td>16</td>
<td>N/A</td>
<td>N/A</td>
<td>Wood, works with a wide variety of topcoats including solvent based</td>
<td>Minimizes grain raise, dries fast, spray, brush or roller application</td>
<td>15-30 min dry</td>
</tr>
<tr>
<td>Van Technologies, Inc 640-VanEx Clear WB Sealer</td>
<td>I/E</td>
<td>49</td>
<td>N/A</td>
<td>N/A</td>
<td>All wood surface applications, compatible with most topcoat applications</td>
<td>Minimizes grain raise, dries fast, based on exterior grade acrylic polymers and use of UV absorbers, contains fungicide/mildewcide</td>
<td>15-30 min dry</td>
</tr>
<tr>
<td>Vista Paint, 190 Uniprep, WB Vinyl Acrylic</td>
<td>I</td>
<td>35</td>
<td>28</td>
<td>400-450</td>
<td>New drywall and plaster</td>
<td>Fills and levels uneven new drywall</td>
<td>1 hr touch 2 hr recoat</td>
</tr>
<tr>
<td>Vista Paint, 4000 Uniprime 100% Acrylic</td>
<td>I/E</td>
<td>50</td>
<td>41</td>
<td>350-375</td>
<td>New concrete, masonry, wood, galvanized metal and aluminum</td>
<td>Excellent resistance to efflorescence and alkalinity</td>
<td>1 hr touch 2-4 hr recoat</td>
</tr>
<tr>
<td>Vista Paint, 4200 Terminator II Acrylic Epoxy-Ester</td>
<td>I/E</td>
<td>50</td>
<td>42</td>
<td>300-375</td>
<td>Wood, drywall and acoustical ceilings</td>
<td>Excellent for blocking water stains, crayons, markers, holds back tannic acid bleeding</td>
<td>2-4 hr touch 24 hr recoat</td>
</tr>
<tr>
<td>Vista Paint, 6000 Earth Coat Acrylic Primer</td>
<td>I</td>
<td>18</td>
<td>39</td>
<td>350-500</td>
<td>New concrete, plaster, masonry, drywall and wood</td>
<td>Superior adhesion, excellent base</td>
<td>45 min touch 6 hr recoat</td>
</tr>
</tbody>
</table>

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)
<table>
<thead>
<tr>
<th>Coating Company and Product Name</th>
<th>Interior Exterior</th>
<th>VOC content (gm/l)</th>
<th>Solids (% by volume)</th>
<th>Coverage (sq ft/gal @3mils)</th>
<th>Recommended Substrate/Exposure</th>
<th>Coating Characteristics</th>
<th>Dry Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloverdale Paint, 70329 Ecologic Rustex WB Primer</td>
<td>I/E</td>
<td>99</td>
<td>40</td>
<td>641</td>
<td>General purpose direct-to-metal primer for properly prepared ferrous and non-ferrous metals at industrial, commercial and/or institutional applications</td>
<td>Good corrosion resistance, re-coat tolerant, adhesion to wide range of substrates</td>
<td>15 min touch 2 hr recoat</td>
</tr>
<tr>
<td>Cloverdale Paint, 70700 Zero VOC Latex Drywall Sealer</td>
<td>I</td>
<td>0</td>
<td>30</td>
<td>190-310</td>
<td>Drywall at schools, institutions, hospitals, hotels, offices</td>
<td>Good hiding, scaling and sandability properties, may be used under any architectural coating</td>
<td>30 min touch 2 hr recoat</td>
</tr>
<tr>
<td>Cloverdale Paint, 90700 Horizon Interior Drywall Sealer, Vinyl Acrylic Latex</td>
<td>I</td>
<td>1</td>
<td>27</td>
<td>216-288</td>
<td>For schools, hospitals, nursing homes, offices and other smell-sensitive areas on drywall, plaster, textured ceilings, wallboard, fiberboard, and hardboard.</td>
<td>Low odor, flat</td>
<td>30 min tackfree 2 hr recoat</td>
</tr>
<tr>
<td>Color Wheel Paints &amp; Coatings, 8300 Gloss Prep WB Undercoat</td>
<td>I</td>
<td>73</td>
<td>37</td>
<td>300-500</td>
<td>Wall board, plaster, masonry, stucco, wood, plywood, acoustical ceiling tiles</td>
<td>Excellent enamel holdout, excellent adhesion, very good hiding, fast drying</td>
<td>30 min touch 1 hr recoat</td>
</tr>
<tr>
<td>Columbia Paint &amp; Coatings, 05-208-PP Premium Pro-Pro-Shield II WB Styrene Acrylic Latex</td>
<td>I/E</td>
<td>70</td>
<td>41</td>
<td>325</td>
<td>New or previously painted rough and smooth siding; wood, plywood, aluminum and vinyl siding, hardboard, masonry, concrete, stucco, iron and steel, galvanized metal</td>
<td>Stain blocker, permeable and flexible film, reduces face checking</td>
<td>30 min touch 1 hr recoat</td>
</tr>
<tr>
<td>Columbia Paint &amp; Coatings, 05-210 Hi-Performance Fast Dry Molding Primer Vinyl Acrylic Latex</td>
<td>I/E</td>
<td>56</td>
<td>40</td>
<td>320</td>
<td>For job site spray application over new interior wood</td>
<td>Highly abrasion resistant, excellent block resistance, high degree of hold-out</td>
<td>5-10 min touch 1 hr recoat</td>
</tr>
<tr>
<td>Davis Paint Company, 0780 Da-Luxe Universal First Coat Primer, Acrylic/Alkyd</td>
<td>I/E</td>
<td>101</td>
<td>42</td>
<td>400</td>
<td>Iron, steel, galvanized metal, wood, masonry, drywall</td>
<td>Durable, can block out smoke damage</td>
<td>30 min touch 2 hr recoat</td>
</tr>
<tr>
<td>Davis Paint Company, 0790 Acrylic Stain Block</td>
<td>I/E</td>
<td>71</td>
<td>42</td>
<td>400</td>
<td>All ferrous and non-ferrous metals, wood and wood by-products, masonry, drywall</td>
<td>Durable, sandable, can be used to block smoke damage and stains</td>
<td>30 min touch 2 hr recoat</td>
</tr>
<tr>
<td>Davis Paint Company, 2475 Hold-Tite Acrylic Latex House Paint Primer</td>
<td>E</td>
<td>89</td>
<td>33</td>
<td>400</td>
<td>Both new and previously painted wood</td>
<td>Durable, quick dry, outstanding blister resistance, nilew resistance and color retention</td>
<td>30 min touch 2 hr recoat</td>
</tr>
<tr>
<td>ICI Paints (Color Your World), 8791 Acrylic Blokker Primer</td>
<td>I/E</td>
<td>97</td>
<td>49</td>
<td>200</td>
<td>Wood, plaster, drywall, concrete, stucco, masonry</td>
<td>Stain blocker including smoke, graffiti, crayon, lipstick and grease, excellent adhesion to glossy surfaces</td>
<td>30 min touch 2 hr recoat</td>
</tr>
<tr>
<td>ICI Paints (Devoe), 4020PF DEVFLEX WB Acrylic Direct-to-Metal Primer &amp; Flat Finish (1000 White/7100 Red)</td>
<td>I/E</td>
<td>76-80</td>
<td>44</td>
<td>275-350</td>
<td>Exterior of tanks, metal buildings, structural steel, piping, handrails, masonry construction</td>
<td>Direct-to-metal or masonry primer, low odor, resists flash rust, corrosion resistance, fast dry</td>
<td>30 min touch 2 hr recoat</td>
</tr>
<tr>
<td>ICI Paints (Devoe), 8502 White/8520 Red Oxide Mirrolac-WB Acrylic Direct-To-Metal Flat Primer and Finish</td>
<td>I/E</td>
<td>77</td>
<td>44</td>
<td>275-350</td>
<td>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.</td>
<td>Non-flammable, fast dry and recoat, resists flash rust, corrosion resistance, hard durable film.</td>
<td>30 min touch 2 hr recoat</td>
</tr>
<tr>
<td>ICI Paints (Dulux), 1030-1200 Prep &amp; Prime PVA Wall, WB Vinyl Acrylic Primer</td>
<td>I/E</td>
<td>100</td>
<td>26</td>
<td>400</td>
<td>Drywall, concrete block, brick</td>
<td>Fast drying, high hiding</td>
<td>30 min touch 2 hr recoat</td>
</tr>
<tr>
<td>ICI Paints (Dulux), 2000-1200 Prep &amp; Prime House, 100% Acrylic WB Primer Sealer</td>
<td>E</td>
<td>95</td>
<td>50</td>
<td>300-500</td>
<td>Wood, concrete, masonry, non-ferrous metal</td>
<td>Fast drying, resistant to blistering, cracking and peeling, excellent adhesion and hide, mildew resistant, moisture and alkali resistant</td>
<td>30 min touch 1 hr recoat</td>
</tr>
<tr>
<td>ICI Paints (Dulux), 1482-1200 Spraymaster Pro, Uni-Grip-WB Aquacrylic Dryfall Eggshell Primer &amp; Finish</td>
<td>I/E</td>
<td>26</td>
<td>34</td>
<td>272-361</td>
<td>For ceilings and multiple overhead surfaces such as those in offices warehouse, stores, textile mills and industrial plants, suitable for galvanized decking. Excellent adhesion, resists flash rusting, easy clean-up of overspray, low odor, good moisture resistance.</td>
<td>15 min touch 2 hr recoat</td>
<td></td>
</tr>
<tr>
<td>ICI Paints (Dulux), 1486-1200 Spraymaster Pro, Uni-Grip-WB Aquacrylic Dryfall Semi-Gloss Primer &amp; Finish</td>
<td>I/E</td>
<td>39</td>
<td>40</td>
<td>350-450</td>
<td>For ceilings and multiple overhead surfaces such as those in offices warehouse, stores, textile mills and industrial plants, suitable for galvanized decking. Excellent adhesion, resists flash rusting, easy clean-up of overspray, low odor, good moisture resistance.</td>
<td>15 min touch 2 hr recoat</td>
<td></td>
</tr>
<tr>
<td>ICI Paints (Glidden), GL3210 Ultra-Hide Aquacrylic Gripper Stain Killer Primer-Sealer</td>
<td>E</td>
<td>95</td>
<td>50</td>
<td>300-450</td>
<td>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 &amp; hide, quick drying, moisture and alkali resistant</td>
<td>30 min touch 1 hr recoat</td>
<td></td>
</tr>
<tr>
<td>International Protective Coatings, Intercryl 520 Waterborne Acrylic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Properly prepared metal, concrete, wood at offshore structures, bridges, refineries, petrochemical and chemical plants</td>
<td>Rust inhibitive</td>
<td>30 min touch 1 hr hard dry</td>
</tr>
<tr>
<td>Kwal Paint (PPG), 5193 Accu-Pro Clear Acrylic Sealer</td>
<td>I/E</td>
<td>84</td>
<td>29</td>
<td>200-350</td>
<td>Vertical/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</td>
<td>30 min touch 1 hr recoat 24 hr cure</td>
<td></td>
</tr>
<tr>
<td>Morewear Manufacturing Inc, 4077 Quick Grip Quick Dry Enamel Undercoater</td>
<td>I/E</td>
<td>63</td>
<td>40</td>
<td>200-400</td>
<td>Plaster, walls, drywall, concrete, brick, hardboard, wood Quick drying, excellent adhesion, sandable, good enamel holdout</td>
<td>30 min touch 2 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Pittsburgh Paints (PPG), 4-603 Perma-Crete, 100% Acrylic Latex</td>
<td>I/E</td>
<td>99</td>
<td>37</td>
<td>400-500</td>
<td>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.</td>
<td>30 min touch 1 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Pittsburgh Paints (PPG), 17-21 Seal Grip Acrylic Latex Stain Blocker</td>
<td>I/E</td>
<td>96</td>
<td>38</td>
<td>400-500</td>
<td>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</td>
<td>30 min touch 1 hr recoat 4 hr cure</td>
<td></td>
</tr>
<tr>
<td>Pittsburgh Paints (PPG), 17-921 Seal Grip, 100% Acrylic Universal Primer/Sealer</td>
<td>I/E</td>
<td>96</td>
<td>38</td>
<td>400-500</td>
<td>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.</td>
<td>30 min touch 1 hr recoat 4 hr cure</td>
<td></td>
</tr>
<tr>
<td>Porter Paints (PPG), 184 STA-KIL WB 100% Acrylic Stain Blocker</td>
<td>I/E</td>
<td>96</td>
<td>38</td>
<td>200-400</td>
<td>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</td>
<td>30 min touch 1 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Resene Paints Limited, D45 Quick Dry Acrylic Primer Undercoater</td>
<td>I/E</td>
<td>64</td>
<td>N/A</td>
<td>135</td>
<td>Block, brick, cement plaster, wallboards, timber, wallpaper, repaint Good chemical and solvent resistance, excellent durability, excellent adhesion, excellent flow &amp; sanding properties Highly resistant to stain bleed due to smoke and fire damage, water, sap, knots, ink, markers, lipstick and grease</td>
<td>20 min touch 2-4 hr recoat 30 min touch 1 hr recoat 1-4 hr recoat 30 min touch 2 hr sand/recoat</td>
<td></td>
</tr>
<tr>
<td>Sampson Coatings, 22305 Latex Stain Blocker</td>
<td>I/E</td>
<td>70</td>
<td>46</td>
<td>736</td>
<td>Painted drywall, wood, plaster, and bleeding-type pigmented bulletin colors and sign paints</td>
<td></td>
<td>30 min touch 1 hr recoat</td>
</tr>
<tr>
<td>Sherwin Williams, 108.04 PrepRite ProBlock Acrylic Latex Primer/Sealer B51 Series</td>
<td>I/E</td>
<td>99</td>
<td>36</td>
<td>400</td>
<td>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</td>
<td>30 min touch 1 hr recoat 1-4 hr recoat 30 min touch 2 hr sand/recoat</td>
<td></td>
</tr>
<tr>
<td>Sherwin Williams, 108.07 PrepRite Classic Acrylic Latex Primer B28W101</td>
<td>I</td>
<td>90</td>
<td>40</td>
<td>400</td>
<td>Drywall, cured plaster, textured walls, aluminum, wood, pre primed metal, galvanized metal Quick drying, fast sanding, excellent coverage, quality sealer under wallcovering</td>
<td>30 min touch 1 hr recoat 1 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Sierra Performance (Rust-Oleum), Griptec Multi-Surface Sandable Primer WB Acrylic</td>
<td>I/E</td>
<td>0</td>
<td>40</td>
<td>180-545</td>
<td>Concrete, masonry, metal, galvanized steel, plastic, wallboard, wood, plaster, stucco, and previously painted surfaces Fast drying, excellent hiding power and adhesion</td>
<td>30 min touch 1-2 hr recoat</td>
<td></td>
</tr>
</tbody>
</table>
### Rust Preventative Coatings (≤ 100 g/l)

<table>
<thead>
<tr>
<th>Coating Company and Product Name</th>
<th>Interior Exterior</th>
<th>VOC content (gm/l)</th>
<th>Solids (% by volume)</th>
<th>Coverage</th>
<th>Recommended Substrate/Exposure</th>
<th>Coating Characteristics</th>
<th>Drying time to recoat</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Formulating and Manufacturing MetalCoat Acrylic Metal Primer</td>
<td>I/E</td>
<td>93</td>
<td>N/A</td>
<td>300</td>
<td>Steel, galvanized iron and aluminum</td>
<td>Thermoplastic acrylic emulsion, rust inhibiting pigments, tough and flexible film, excellent adhesion, outstanding corrosion resistance</td>
<td>30 min touch 4 hr recoat</td>
</tr>
<tr>
<td>Benjamin Moore, MO4 Acrylic Metal Primer</td>
<td>P/I/T</td>
<td>51</td>
<td>40</td>
<td>320</td>
<td>Metal including galvanized, barrier coat over zinc coated surfaces, damp surfaces, poured or cast concrete and brick</td>
<td>Rust inhibitive, fast dry, excellent adhesion</td>
<td>30 min touch 2 hr recoat</td>
</tr>
<tr>
<td>Cloverdale Paint, 70329 Ecologic Rustex WB Primer</td>
<td>I/E</td>
<td>99</td>
<td>40</td>
<td>641</td>
<td>General purpose direct-to-metal primer for properly prepared ferrous and non-ferrous metals at industrial, commercial and/or institutional applications</td>
<td>Good corrosion resistance, re-coat tolerant, adhesion to wide range of substrates</td>
<td>15 min touch 2 hr recoat</td>
</tr>
<tr>
<td>Color Wheel Paints &amp; Coatings, 1635 Aquatic Industrial Acrylic Primer</td>
<td>P</td>
<td>87</td>
<td>44</td>
<td>300-500</td>
<td>Structural steel, aluminum, galvanized metals, ferrous metals, copper, stainless steel, fiberglass, polysyrene, porcelain</td>
<td>Chemical resistant, corrosion resistant, fast drying, early moisture resistant, early rust resistant</td>
<td>30 min touch 2 hr recoat</td>
</tr>
<tr>
<td>Davis Paint Company, 0790 Acrylic Stain Block</td>
<td>I/E</td>
<td>71</td>
<td>42</td>
<td>400</td>
<td>All ferrous and non-ferrous metals, wood and wood by-products, masonry, drywall</td>
<td>Durable, sandable, can be used to block smoke damage and stains</td>
<td>30 min touch 2 hr recoat</td>
</tr>
<tr>
<td>Duron Paints &amp; Wallcoverings, 33-105 Acrylic Metal Primer</td>
<td>I/E</td>
<td>80</td>
<td>34</td>
<td>225-250</td>
<td>Galvanized and ferrous metal surfaces, aluminum</td>
<td>Quick dry, resistant to peeling and chipping, rust resistant, intangible</td>
<td>1 hr touch 8 hr recoat</td>
</tr>
<tr>
<td>EPMAR, Sta-crete #47 Industrial Metal Primer WB Acrylic</td>
<td>I/E</td>
<td>58</td>
<td>40</td>
<td>250-300</td>
<td>Steel storage tank exteriors, steel bridges, piping and pump equipment, rebar, OEM metal applications, marine steel decks</td>
<td>Corrosion resistance, fast dry, highly adhesive, moisture tolerant, single component</td>
<td>2 hr topcoat 48 hr cure</td>
</tr>
<tr>
<td>EPMAR, Kemiko Col-R Tone III Acrylic Urethane</td>
<td>I/E</td>
<td>49</td>
<td>60</td>
<td>300-400</td>
<td>Floors, facades, steel, concrete storage tank exteriors, concrete bridges, pump equipment</td>
<td>UV, abrasion and stain resistance, resilient, non-yellowing, quick dry,</td>
<td>1 hr recoat 48 hr cure</td>
</tr>
<tr>
<td>Farwest, X-6785 Aquashield II Fast Dry Red Oxide Waterborne Shop Primer</td>
<td>I/E</td>
<td>76</td>
<td>38</td>
<td>300-400</td>
<td>Metal Surfaces</td>
<td>Water and corrosion resistant film</td>
<td>30-45 min touch 1-3 hr recoat</td>
</tr>
<tr>
<td>Farwest, X-6791 Aquashield II, Waterborne Rust-Inhibitive Primer</td>
<td>E</td>
<td>76</td>
<td>38</td>
<td>300-400</td>
<td>Metal Surfaces</td>
<td>Fast drying, water and corrosion resistant film</td>
<td>30-45 min touch, 1-3 hr recoat</td>
</tr>
<tr>
<td>Flex Bon Paints, 194 Series, Premium Acrylic Primer</td>
<td>I/E</td>
<td>70</td>
<td>39</td>
<td>400</td>
<td>Concrete, masonry, stucco, wood, steel, galvanized metal, aluminum, asbestos siding, plaster or hardcoat</td>
<td>Alkali resistant, good stain blocking, flash rust resistant</td>
<td>2-4 hr touch, 18 hr recoat</td>
</tr>
<tr>
<td>Frazee Paint (PPi), 066 Envirotekne Acrylic Copolymer Primer</td>
<td>I</td>
<td>4</td>
<td>42</td>
<td>100-400</td>
<td>Concrete, masonry, drywall, plaster, hardboard, metal, wood</td>
<td>Top of the line quality</td>
<td>1 hr touch, 2-3 hr recoat</td>
</tr>
<tr>
<td>Frazee Paint (PPi), 168 Prime Plus Acrylic Primer Sealer Stain Killer</td>
<td>I/E</td>
<td>60</td>
<td>45</td>
<td>200-400</td>
<td>Concrete/masonry, drywall, plaster, metal, wood</td>
<td>Resists alkali on concrete and masonry, not for use on floors</td>
<td>1 hr touch, 2-3 hr recoat, 7 day cure</td>
</tr>
<tr>
<td>Hallman Lindsay Quality Paints, 178 Metal Kote 100% Acrylic DTM</td>
<td>I/E</td>
<td>39</td>
<td>37</td>
<td>320</td>
<td>Refinishing and/or restoring commercial, office and light industrial structures</td>
<td>Corrosion-Resistant formulation, outstanding adhesion, color and gloss retention</td>
<td>2 hr touch, Overnight recoat</td>
</tr>
<tr>
<td>ICI Paints (Devoe), 4020PF DEVFLEX WB Acrylic Direct-to-Metal Primer &amp; Flat Finish (1000 White/7100 Red)</td>
<td>I/E</td>
<td>76-80</td>
<td>44</td>
<td>275-350</td>
<td>Exterior of tanks, metal buildings, structural steel, piping, handrails, masonry construction</td>
<td>Direct-to-metal or masonry primer, low odor, resists flash rust, corrosion resistance, fast dry</td>
<td>30 min touch, 2 hr recoat</td>
</tr>
<tr>
<td>ICI Paints (Devoe), 8502 White/8520 Red Oxide Mirrolac-WB Acrylic Direct-to-metal Flat Primer and Finish</td>
<td>I/E</td>
<td>77</td>
<td>44</td>
<td>275-350</td>
<td>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.</td>
<td>Non-flammable, fast dry and recoat, resists flash rust, corrosion resistance, hard durable film.</td>
<td>30 min touch, 2 hr recoat</td>
</tr>
<tr>
<td>Insl-X Superior Coating Systems, RA-0104 Rust Arrestor</td>
<td>I/E</td>
<td>90</td>
<td>26</td>
<td>208</td>
<td>Rusted areas where sandblasting is not acceptable, repair and maintenance of existing systems</td>
<td>Chemically converts tightly adhered rust to a black iron complex thus stopping the corrosion mechanism</td>
<td>2 hr touch, 4 hr recoat</td>
</tr>
<tr>
<td>International Protective Coatings, Intercryl 520 Waterborne Acrylic</td>
<td>E</td>
<td>43</td>
<td>44</td>
<td>353</td>
<td>Properly prepared metal, concrete, wood at offshore structures, bridges, refineries, petrochemical and chemical plants</td>
<td>Rust inhibitive</td>
<td>30 min touch, 1 hr hard dry</td>
</tr>
<tr>
<td>Manufacturing &amp; Consulting Chemists Inc, 208 Series DTM High Build Acrylic Topcoat</td>
<td>I/E</td>
<td>100</td>
<td>40</td>
<td>N/A</td>
<td>Steel, aluminum, galvanized surfaces, plastic and glass</td>
<td>Excellent adhesion, good abrasion and chemical resistance</td>
<td>30 min touch, 1 hr to handle, 72 hr cure</td>
</tr>
<tr>
<td>Monopole Inc, Monochem Aquaprime DTM, Acrylic Co-polymer</td>
<td>I/E</td>
<td>&lt;100</td>
<td>36</td>
<td>200-450</td>
<td>Steel surfaces, adheres to most substrates</td>
<td>Rust inhibiting to accept a variety of corrosive and chemical resistant topcoats</td>
<td>1 hr touch, 1 hr recoat</td>
</tr>
<tr>
<td>Parker Paint (PPi), 1821 Galv-O-Prime, Acrylic Latex</td>
<td>E</td>
<td>75</td>
<td>45</td>
<td>490</td>
<td>Galvanized and aluminum surfaces</td>
<td>Excellent coverage, durability, adhesion and self etching; Resists cracking, checking, peeling and corrosion</td>
<td>2 hr tack free, 24 hr recoat</td>
</tr>
<tr>
<td>Porter Coatings (PPG), 2809 Porter Guard, DTM Acrylic Satin Enamel</td>
<td>I/E</td>
<td>85</td>
<td>39</td>
<td>250-400</td>
<td>Properly prepared iron, steel, aluminum, galvanized metals, and many painted surfaces such as masonry and wood</td>
<td>High hiding, non-yellowing, excellent touch-up, flash rust resistant, washable</td>
<td>15-30 min touch, 4 hr recoat</td>
</tr>
<tr>
<td>Premium Coatings, LLC, Premium Liquid Rubber ® Premium 204</td>
<td>E</td>
<td>0</td>
<td>N/A</td>
<td>N/A</td>
<td>Fully bonds to most substrates. Numerous applications such as corrosion and rust protection of most metals, waterproofing &amp; concrete protection, roofing repairs.</td>
<td>Water based, odorless, non toxic, free of VOC's, single component.</td>
<td>24 hr cure</td>
</tr>
<tr>
<td>Sierra Performance (Rust-Oleum), MetalMax DTM Acrylic Urethane</td>
<td>I/E</td>
<td>0</td>
<td>40</td>
<td>180-545</td>
<td>Aluminum, galvanized steel, steel</td>
<td>Excellent corrosion and humidity resistance, UV resistant, fast drying, self-priming</td>
<td>30 min touch, 2-4 hr recoat</td>
</tr>
<tr>
<td>Spectra-Tone Paint Corporation, #975 DTM Acrylic Gloss Enamel</td>
<td>I/E</td>
<td>78</td>
<td>36</td>
<td>400-500</td>
<td>Wood, metal, or masonry surfaces including walls, doors, trim, sash, and piping</td>
<td>Superior adhesion, direct-to-metal, extremely tough, fast drying, flexible, corrosion and abrasive resistant, block resistance, resists staining</td>
<td>2-4 hr touch, 4 hr recoat</td>
</tr>
</tbody>
</table>
### Rule 1113 Future Compliant Coatings

**2004-2005 Technology Assessment**

**December 2005**

<table>
<thead>
<tr>
<th>Coating Company and Product Name</th>
<th>Opaque</th>
<th>Semitransparent</th>
<th>Transparent</th>
<th>Wiping</th>
<th>VOC content (gm/l)</th>
<th>Solids (% by volume)</th>
<th>Coverage (sq ft/gal)</th>
<th>Recommended Substrate/Exposure</th>
<th>Coating Characteristics</th>
<th>Drying Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thortex America, Inc., Corro-Tech R.C. Single Component</td>
<td>P</td>
<td>56</td>
<td>37</td>
<td>159</td>
<td>Designed for use as a rust conversion primer for use on manually prepared rusty steelwork in non aggressive environments.</td>
<td>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 recoated.</td>
<td>30 min touch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thortex America, Inc., Corro-Tech W.P. Single Component</td>
<td>E</td>
<td>84</td>
<td>45</td>
<td>97</td>
<td>Designed for long term protection of blast cleaned mild steel and cast ferrous substrates.</td>
<td>High performance water based system with anti-corrosive resistance.</td>
<td>20 min touch</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N/A = Not Available

### Stains (Exterior ≤ 100 g/l)

<table>
<thead>
<tr>
<th>Coating Company and Product Name</th>
<th>Opaque</th>
<th>Semitransparent</th>
<th>Transparent</th>
<th>Wiping</th>
<th>VOC content (gm/l)</th>
<th>Solids (% by volume)</th>
<th>Coverage (sq ft/gal)</th>
<th>Recommended Substrate/Exposure</th>
<th>Coating Characteristics</th>
<th>Drying Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benjamin Moore, 179 Super Spec Acrylic Solid Color Exterior Stain</td>
<td>O</td>
<td>37</td>
<td>29</td>
<td>300-450</td>
<td>Rough wood siding, shakes, shingles, hardboard siding, trim and fencing, masonry, stucco</td>
<td>Fast dry, excellent hiding and adhesion, alkali, blistering, mildew resistant</td>
<td>2 hr touch 3 hr recoat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benjamin Moore, N089 100% Acrylic Latex Solid Siding Stain</td>
<td>O</td>
<td>7</td>
<td>33</td>
<td>200-400</td>
<td>Rough siding, plywood, hardboard and fiber-cement siding, shingles, trim, railings, fencing, stucco, masonry and aluminum</td>
<td>Fast drying, milde resistant, excellent color retention</td>
<td>2-3 hr touch 3-4 hr recoat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Columbia Paint &amp; Coatings, Woodtech Solid Color Latex Stain 09-400</td>
<td>O</td>
<td>71</td>
<td>34</td>
<td>290</td>
<td>Wood siding, hardboard, brick, concrete, galvanized and aluminum metal</td>
<td>Excellent water resistance, adhesion, color retention, alkali resistant, stain blocking</td>
<td>½-1 hr touch 2 hr recoat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Davis Paint Company, 3900 Zytex Wood Oil Protector</td>
<td>T</td>
<td>47</td>
<td>94</td>
<td>150-300</td>
<td>Fences, siding or other vertical surfaces</td>
<td>Contains a special non-drying natural oil to provide maximum water repellency, contains mildewcides</td>
<td>Non-drying to touch Overnight recoat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degussa/ChemRex, Thoro Pigmented Sealer, WB Acrylic Stain</td>
<td>S</td>
<td>92</td>
<td>30</td>
<td>260-320</td>
<td>Concrete, stucco, brick masonry</td>
<td>Color uniformity, resistant to dirt pickup, vapor permeable, UV resistant</td>
<td>1-2 hr touch 2-4 hr recoat 5-day cure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dunn Edwards, W 704 Acri-Flat 100% Acrylic Ext Wood Stain/Masonry Flat Paint</td>
<td>O</td>
<td>70</td>
<td>40</td>
<td>300-400</td>
<td>Masonry, concrete, tift-up, block, stucco, plaster, exterior metal</td>
<td>Excellent color retention, good grain crack resistance, self priming</td>
<td>1-2 hr touch 4-6 hr recoat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-3 Coatings Inc, Envirolast XT Wood Stain &amp; Seal</td>
<td>S/T</td>
<td>0</td>
<td>25</td>
<td>250-350</td>
<td>Decks, siding roofs, fences and outdoor furniture</td>
<td>Deep penetration, full transparency, excellent adhesion, high durability, emulsified long oil alkyd, use over oil stains</td>
<td>15-30 min tack Immediate recoat 12-24 hr cure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPMAR, Kerniko Stone Tone Concrete Stain</td>
<td>O</td>
<td>0</td>
<td>N/A</td>
<td>N/A</td>
<td>Concrete driveways, patios, walkways,</td>
<td>UV Resistant, interior/exterior application, acid base,</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPMAR, Rembrandt Polymer Stain, Water Extended Acrylic Urethane</td>
<td>O</td>
<td>&lt;49</td>
<td>20</td>
<td>150-300</td>
<td>Concrete, plaster, polymer cement, and wood as a stain, wash or faux finish</td>
<td>Chemical resistant, excellent adhesion, UV stability, outstanding wear qualities</td>
<td>0.5-1 hr touch 2-3 hrs clear coat</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Ferti Paint and Stain Corp. 410 Series Stormcoat 100% Acrylic Body Stain</td>
<td>O</td>
<td>46</td>
<td>25</td>
<td>250-300</td>
<td>All wood surfaces</td>
<td>Fade resistant, excellent leveling and hiding, unsurpassed color retention</td>
<td>30 min touch 2 hr recoat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuhr International, 105 Acrylic/ Wiping Stain</td>
<td>W</td>
<td>30</td>
<td>14</td>
<td>N/A</td>
<td>Any wood surface</td>
<td>Little to no grain raising, compatible with pigments &amp; dyes, may be force dried with heat, film forming, fast drying</td>
<td>45 min. before seal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuhr International, 155 ZVOC Universal WB Acrylic Stain</td>
<td>O</td>
<td>0</td>
<td>14</td>
<td>N/A</td>
<td>Any Interior wood surface</td>
<td>Little to no grain raising, compatible with pigments &amp; dyes, may be force dried with heat, fast drying</td>
<td>15 min before seal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Company</td>
<td>Product Name</td>
<td>Color Code</td>
<td>Viscosity</td>
<td>Test Panel</td>
<td>Description</td>
<td>Dry Time</td>
<td></td>
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<tr>
<td>Fuhr International</td>
<td>5800 ZVOC WB Acrylic Stain</td>
<td>0</td>
<td>14</td>
<td>N/A</td>
<td>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.</td>
<td>5 min. tc</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>5900 ZVOC WB Acrylic Deck Stain</td>
<td>0</td>
<td>30</td>
<td>N/A</td>
<td>Furniture, molding, millwork, cabinets, doors, decks. Chemical resistant, water resistant, excellent substrate wetting and color control, overall durability, UV protection, fast dry.</td>
<td>5 min. tc</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>General Paint (PP),</td>
<td>72-Line Woodcraft Solid Colour Latex Stain</td>
<td>O</td>
<td>98</td>
<td>27</td>
<td>Exterior smooth or rough siding, shakes, shingles and fencing. Quick drying, densely pigmented.</td>
<td>15-60 min</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>74-Line Platinum 100% Acrylic Stain</td>
<td>O</td>
<td>100</td>
<td>33</td>
<td>Exterior smooth or rough siding, shakes, shingles and fencing. Quick drying, densely pigmented, mildew resistant, fade resistant.</td>
<td>15-60 min</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Hallman Lindsay Quality Paints</td>
<td>185 Kril Tone 100% Acrylic Solid Color Stain</td>
<td>O/S</td>
<td>98</td>
<td>35</td>
<td>Shingles, shakes, siding, fencing, most hardboard. Outstanding color retention, mildew resistant, excellent adhesion, durable.</td>
<td>2 hr touch</td>
<td></td>
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</tr>
<tr>
<td>ICI Paints (Dulux)</td>
<td>E600-XXXX Wood Pride 100% Acrylic Premium Solid Color Wood Stain</td>
<td>O</td>
<td>98</td>
<td>35</td>
<td>Wood, stucco, masonry, primed metal. Mildew resistant, water resistant.</td>
<td>½-1 hr touch</td>
<td></td>
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<tr>
<td>ICI Paints (Sinclair)</td>
<td>4700 Acrylic Stainteke</td>
<td>O</td>
<td>87-98</td>
<td>36</td>
<td>Wood, stucco, masonry, primed metal. Mildew resistant, water resistant.</td>
<td>4 hr recoat</td>
<td></td>
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<tr>
<td>Kelly-Moore Paints</td>
<td>1285 Acry-Shield Oil/Latex Stain Base, Vinyl Acrylic, Alkyd, Oil</td>
<td>T</td>
<td>65</td>
<td>33</td>
<td>Wood for residential or commercial application. Excellent weather resistance and color retention.</td>
<td>1 hr touch</td>
<td></td>
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</tr>
<tr>
<td>Martin Senour,</td>
<td>41-1006 Great Outdoors Latex Solid Color Wood Siding Stain - Better</td>
<td>O</td>
<td>71</td>
<td>25</td>
<td>Smooth or rough-sawn lumber, siding, composition board, shakes, shingles, fences, metal and masonry. Chalk, fade, bleed resistant, fast drying and self priming.</td>
<td>1 hr touch</td>
<td></td>
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</tr>
<tr>
<td>Martin Senour,</td>
<td>45-1001 Great Outdoors Latex Solid Color Wood Siding Stain - Best</td>
<td>O</td>
<td>97</td>
<td>34</td>
<td>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.</td>
<td>1 hr touch</td>
<td></td>
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</tr>
<tr>
<td>Okon Inc</td>
<td>OK-710 Weather Pro, Acrylic Emulsion</td>
<td>S w/pigment</td>
<td>70</td>
<td>15</td>
<td>Interior/Exterior decks, fencing, shakes, siding. Super color retention, UV resistant with colorant, water repellent.</td>
<td>2 hr touch</td>
<td></td>
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</tr>
<tr>
<td>Resene Paints Limited</td>
<td>D57a Woodsman Penetrating Oil Stain</td>
<td>T</td>
<td>85</td>
<td>N/A</td>
<td>Fully penetrating on bare wood, contains fungicide, easy application.</td>
<td>24 hr recoat</td>
<td></td>
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</tr>
<tr>
<td>Sherwin Williams,</td>
<td>105.12 ProMar Exterior Solid Color Acrylic Latex Stain A16 Series</td>
<td>O</td>
<td>97</td>
<td>32</td>
<td>Wood sawn lumber, plywood, shakes, shingles, masonry, concrete, aluminum. Fast application &amp; drying, good penetration.</td>
<td>1 hr touch</td>
<td></td>
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</tr>
<tr>
<td>Silvertown Products,</td>
<td>Rhinoguard Furniture Stain and Finish</td>
<td>O/S/T</td>
<td>0</td>
<td>N/A</td>
<td>Furniture, doors, wood beams. Fade Resistant, resistant to many oils and greases, contains Gilsonite.</td>
<td>24 hr recoat</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Silvertown Products,</td>
<td>Rhinoguard Wood Defense</td>
<td>O/S/T</td>
<td>0</td>
<td>30</td>
<td>Wood, decks, siding. UV, scuff, water, mildew and fungus resistant contains Gilsonite.</td>
<td>24 hrs to walk</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Tamms Industries,</td>
<td>T-96 Aquastain Based on Acrylic Resins</td>
<td>O</td>
<td>&lt;50</td>
<td>35-45</td>
<td>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.</td>
<td>15-45 min</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Van Technologies Inc</td>
<td>220 Van Aqua WB Wood Stain</td>
<td>O</td>
<td>49</td>
<td>N/A</td>
<td>Wood surfaces. Fast drying.</td>
<td>10-20 min dry</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vista Paint</td>
<td>3000 Acrybond 100% Acrylic</td>
<td>O</td>
<td>97</td>
<td>40</td>
<td>Wood, properly primed concrete, stucco, masonry and metal. Solid bodied, durable matte flat finish, mildew resistant, excellent color retention.</td>
<td>1 hr touch</td>
<td></td>
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</tr>
</tbody>
</table>

N/A= Not Available
<table>
<thead>
<tr>
<th>Coating Company and Product Name</th>
<th>Penetrant Film Former</th>
<th>VOC content (gm/l)</th>
<th>Solids (% by volume)</th>
<th>Coverage (sq ft/gal)</th>
<th>Recommended Substrate/Exposure</th>
<th>Coating Characteristics</th>
<th>Dry Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Formulating and ...</td>
<td>P</td>
<td>0</td>
<td>N/A</td>
<td>200-300</td>
<td>Porous brick, pavers, block, concrete and stucco</td>
<td>Good water resistance, non-toxic, low odor, interior/exterior</td>
<td>24 hr recoat</td>
</tr>
<tr>
<td>American Formulating and ...</td>
<td>P</td>
<td>14</td>
<td>N/A</td>
<td>250-300</td>
<td>Porous cementitious materials such as concrete, stucco, brick, block, terrazzo and unglazed tile</td>
<td>Water repellent sealer, resists oils and grease, fast drying, excellent adhesion, control efflorescence in masonry surfaces</td>
<td>2 hr recoat</td>
</tr>
<tr>
<td>Andek, Polagard S, PVC Terpolymer</td>
<td>FF</td>
<td>0</td>
<td>N/A</td>
<td>90-120@10 mils</td>
<td>Areas prone to microbiological growth such as areas were food and drink are stored or prepared</td>
<td>High build elastomeric, waterproof, won't trap water, protection against mold and mildew</td>
<td>2-4 hr recoat</td>
</tr>
<tr>
<td>Behr, Elastomeric Masonry, Stucco &amp; Brick Paint 100% Acrylic Latex - 68</td>
<td>FF</td>
<td>83</td>
<td>N/A</td>
<td>75-125</td>
<td>New or previously painted vertical surfaces made of stucco, masonry, concrete, brick, cement, adjacent wood or metal trim</td>
<td>Flexible high-build coating, extremely durable, mildew &amp; dirt resistant, waterproof, breathable film, excellent color retention, excellent adhesion</td>
<td>4-6 hr recoat</td>
</tr>
<tr>
<td>Davlin Waterproof Coatings, Acrylicastic 490 Waterborne Elastomeric Waterproof Wall Coating</td>
<td>FF</td>
<td>75</td>
<td>60</td>
<td>100</td>
<td>Interior and exterior Concrete, masonry, stucco, most wood &amp; metal substrates</td>
<td>Superior adhesion and waterproofing, peel resistant, extremely tough, resistant to alkali, salt and fungus</td>
<td>4-8 hr recoat</td>
</tr>
<tr>
<td>Davlin Waterproof Coatings, Acrylicastic 600, Waterproof Deck Coating</td>
<td>FF</td>
<td>75</td>
<td>51</td>
<td>100</td>
<td>Decks, patios, balconies, terrace, stairs</td>
<td>Extremely tough, superior flexibility, highly resistant to alkali, salt, ozone, acid rain, UV</td>
<td>3-8 hr recoat</td>
</tr>
<tr>
<td>Davlin Waterproof Coatings, Butylseal 572 Sealer,</td>
<td>P</td>
<td>7</td>
<td>N/A</td>
<td>75-250</td>
<td>For concrete, masonry, stucco and wood surfaces</td>
<td>Good flexibility, adhesion, excellent sealing over chalky or porous surfaces</td>
<td>4 hr recoat</td>
</tr>
<tr>
<td>EPMAR, SS2102 Sta-Crete Urethane Membrane, 2</td>
<td>FF</td>
<td>0</td>
<td>100</td>
<td>100</td>
<td>Excellent water barrier for steel, concrete or wood surfaces</td>
<td>Chemical and moisture resistant, excellent strength, 30 minute pot life</td>
<td>5 hrs to touch</td>
</tr>
<tr>
<td>Euclid Chemical Company (RPM), Super Wall-Pro</td>
<td>FF</td>
<td>75</td>
<td>N/A</td>
<td>100</td>
<td>Masonry, concrete, stucco, metal, stone, plaster, cinder block, insulating finish systems</td>
<td>Elastomeric for excellent resistance to movement, UV stable for exterior exposure, waterproof veneer, excellent weathering resistance</td>
<td>1 hr cure</td>
</tr>
<tr>
<td>GE Sealants &amp; Adhesives, VIP1510 Water Repellent,</td>
<td>P</td>
<td>4</td>
<td>10</td>
<td>100-250</td>
<td>For vertical masonry substrates such as stone; tilt-up concrete, brick, clay tile, stucco and block</td>
<td>UV stable, excellent water repellency, dries clear, non-yellowing, alkali resistant, breathable</td>
<td>72 hr partial cure</td>
</tr>
<tr>
<td>Hallman Lindsay, 180 Elastaguard Elastomeric Coating, 100% Acrylic</td>
<td>FF</td>
<td>26</td>
<td>53</td>
<td>80</td>
<td>Exterior concrete, masonry and stucco.</td>
<td>Flexible, water-resistant coating, high build, mildew-resistant, chalk-resistant, bridges hairline cracks, excellent adhesion</td>
<td>4 hr touch</td>
</tr>
<tr>
<td>Henry Company, 787 ElastoMulsion Waterproofing &amp; Dampproofing,</td>
<td>FF</td>
<td>0</td>
<td>70</td>
<td>25</td>
<td>Above- and below-grade concrete, masonry structures including block foundations</td>
<td>Seamless rubberized asphalt membrane, weathers uniformly, resilient, excellent adhesion, non-flammable</td>
<td>8 hr touch</td>
</tr>
<tr>
<td>ICI Paints (Dulux), 2260 Smooth, 2270 Fine, 2290 Coarse Decra_Flex Elastomeric Acrylic Coating</td>
<td>FF</td>
<td>62-73</td>
<td>45-50</td>
<td>60-115</td>
<td>Above grade vertical masonry, stucco and poured concrete. Also on primed wood, metal and previously painted surfaces</td>
<td>Flexible, bridges hairline cracks, resists dirt pickup, mildew resistant, excellent color retention, waterproof film</td>
<td>4 hr touch</td>
</tr>
<tr>
<td>Monarch Paint Company (PPG), 2500 High Performance 100% Acrylic Elastomeric Waterproof Coatings</td>
<td>FF</td>
<td>84</td>
<td>51</td>
<td>60-100</td>
<td>For new or previously painted above-grade masonry, concrete and stucco surfaces</td>
<td>Chalk resistant, breathable, flexible, bridges hairline cracks, waterproof coating</td>
<td>2 hr touch</td>
</tr>
<tr>
<td>Monopole Inc, 3500 Monochem Aqueascale 2 for Wood, WB Acrylic Micro Emulsion</td>
<td>P</td>
<td>0</td>
<td>N/A</td>
<td>60-250</td>
<td>Solid siding, trim, fencing, plywood, shakes, shingles, deck lumber, patio furniture, doors, window sashes, hardboard, particleboard</td>
<td>Deep penetration, outstanding water repellency, breathable</td>
<td>N/A</td>
</tr>
<tr>
<td>Coating Company and Product Name</td>
<td>Penetrant/Emulsion</td>
<td>VOC content (g/l)</td>
<td>Solids (% by volume)</td>
<td>Coverage (sq ft/gal)</td>
<td>Recommended Substrate/Exposure</td>
<td>Coating Characteristics</td>
<td>Dry Time</td>
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<tr>
<td>Monopole Inc, 3800, 3900 Monochem Permaseal, WB Acrylic Co-Polymer Emulsion</td>
<td>P</td>
<td>&lt;70</td>
<td>N/A</td>
<td>70-325</td>
<td>Interior/Exterior concrete floors, decks, docks, ramps and pavements</td>
<td>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</td>
<td>½ hr touch 24 hr cure</td>
</tr>
<tr>
<td>Pittsburgh Paints (PPG), 4-110 Perma-Crete, 100% Acrylic Latex</td>
<td>FF</td>
<td>98</td>
<td>46</td>
<td>100-134</td>
<td>For exterior masonry surfaces, including properly prepared and primed stucco, cured concrete, cinder block, or for recoating over sound previously painted surfaces.</td>
<td>Excellent flexibility and moisture resistance, the 100% acrylic high build formula repels water.</td>
<td>2½-3 hr touch 6-8 hr recoat</td>
</tr>
<tr>
<td>Rodda Paint, 511301 Super Rooflex Elastomeric Coating, 100% Acrylic Emulsion</td>
<td>FF</td>
<td>89</td>
<td>51</td>
<td>100</td>
<td>Designed as a weather seal, and restoration coating for all types of masonry structures.</td>
<td>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.</td>
<td>3 hr touch 16 hr recoat</td>
</tr>
<tr>
<td>Samuel Cabot Inc, 1000 Cabot Waterproofing With Teflon Surface Protector, Silicone Emulsion</td>
<td>P</td>
<td>0</td>
<td>6</td>
<td>150-250</td>
<td>New or properly reconditioned wood including siding, shingles, decks, shakes, fences, roof, and log homes. Also brick, concrete, masonry, stone and unglazed tile.</td>
<td>Unsurpassed water-proofing protection, mildew resistant, repels oil and grease staining, resistance to dirt pick-up and mildew</td>
<td>3 hr touch 24 hr cure</td>
</tr>
<tr>
<td>Sherwin Williams, 102.35 ConFlex XL Texture High Build A5-800 Series</td>
<td>FF</td>
<td>94</td>
<td>49</td>
<td>70-80</td>
<td>Concrete, stucco, masonry</td>
<td>Extremely strong adhesion, mildew resistant, flexible, durable</td>
<td>4 hrs touch 24 hrs recoat</td>
</tr>
<tr>
<td>Sherwin Williams, 102.36 Sherlastic Elastomeric Coating A5-100 Series</td>
<td>FF</td>
<td>94</td>
<td>41</td>
<td>115-160</td>
<td>A masonry coating system. This may be applied to a surface with a pH of 6 to 12.</td>
<td>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.</td>
<td>4 hr touch 24 hr recoat</td>
</tr>
<tr>
<td>Sherwin Williams, 111.24 H&amp;C WB-50 Water Based Water Repellent, Clear</td>
<td>P</td>
<td>0</td>
<td>3</td>
<td>75-200</td>
<td>Unglazed tile, brick, concrete, plaster</td>
<td>Permeable to water vapor, will not discolor concrete, economical water repellency, retards mold and mildew growth, 5% silicone</td>
<td>1-4 hrs touch When dry for recoat</td>
</tr>
<tr>
<td>Tamms Industries, Tammolastic, Elastomeric Acrylic Coating</td>
<td>FF</td>
<td>&lt;50</td>
<td>N/A</td>
<td>50-80</td>
<td>For exterior concrete, stucco, brick and masonry surfaces.</td>
<td>Flexible, waterproof, bridges hairline cracks. Excellent adhesion, film breathable, resistance to weathering over a long time</td>
<td>12-24 hr recoat</td>
</tr>
</tbody>
</table>

N/A= Not Available

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

<table>
<thead>
<tr>
<th>Coating Company and Product Name</th>
<th>Penetrant/Emulsion</th>
<th>VOC content (g/l)</th>
<th>Solids (% by volume)</th>
<th>Coverage (sq ft/gal)</th>
<th>Recommended Substrate/Exposure</th>
<th>Coating Characteristics</th>
<th>Dry Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>AllPro Corporation, All-Seal Waterproofing Clear Sealer</td>
<td>P</td>
<td>47</td>
<td>14</td>
<td>100-250</td>
<td>Concrete, masonry, stucco, roof, brick, stone, adobe, drywall, plaster, roof tiles, grout, galvanized metal, vinyl siding, wood decks</td>
<td>Highly penetrating, UV, alkali resistant, water repellent</td>
<td>1 hr touch 4-6 hr recoat</td>
</tr>
<tr>
<td>Anchor Paint, P-1120 Uni-Kote Silicone Water Repellent</td>
<td>FF</td>
<td>0</td>
<td>13</td>
<td>209</td>
<td>Above grade vertical surfaces such as block, brick, stucco, hardboard, siding, and natural stone</td>
<td>Excellent flexibility and water resistance</td>
<td>20 min touch 1 hr recoat</td>
</tr>
<tr>
<td>Andek, Polagard Fibrelastic, PVC/Acrylic WB</td>
<td>FF</td>
<td>0</td>
<td>N/A</td>
<td>120@10 mils</td>
<td>Concrete, splitface block, brick, stucco, wood, asbestos shingles, concrete block, mineral composites, precast concrete</td>
<td>UV, mildew and chemical resistance, excellent alkali resistance, breathable, waterproof, elastomeric</td>
<td>N/A</td>
</tr>
<tr>
<td>Andek, Polaseal M-A, Siloxane-Based</td>
<td>P</td>
<td>0</td>
<td>N/A</td>
<td>100-200</td>
<td>Brick, stucco, block, concrete, stone, clay tile, slate, and exposed aggregate</td>
<td>Incredibly durable barrier against weather, pollutants, de-icing chemicals and UV</td>
<td>N/A</td>
</tr>
<tr>
<td>Name</td>
<td>Type</td>
<td>Coverage</td>
<td>Viscosity</td>
<td>Description</td>
<td>Properties</td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>Andek, Polaseal W, WB Silanoate</td>
<td>P</td>
<td>0</td>
<td>N/A</td>
<td>For use on limestone, together with all natural color masonry such as concrete, block, stone, and stucco.</td>
<td>Forms ion exchange linkages independent of alkalinity or silica content, stops liquid phase water penetration, retards oil penetration, waterproof</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>BEHR, No. 980 Concrete &amp; Masonry Silicone Waterproofer</td>
<td>P</td>
<td>12</td>
<td>N/A</td>
<td>Block, pavement, stucco, brick, unglazed tile, concrete, slate.</td>
<td>Excellent penetration, resists spalling, efflorescence, mildew</td>
<td>24-48 hr recoat</td>
<td></td>
</tr>
<tr>
<td>ChemMasters, Colorlastic, 100% Elastomeric Acrylic</td>
<td>FF</td>
<td>48</td>
<td>N/A</td>
<td>For exterior or interior, above grade, vertical and overhead concrete and masonry.</td>
<td>Pigmented, waterproof coating, bridges hairline cracks, decorative sealer, excellent elongation, UV stable, resists wind driven rain, mold, dirt.</td>
<td>24 hr recoat</td>
<td></td>
</tr>
<tr>
<td>ChemMasters, ColorSil, Pigmented Silicate Surface Treatment</td>
<td>P</td>
<td>0</td>
<td>N/A</td>
<td>Uses include interior or exterior, vertical or overhead, concrete and masonry surfaces, concrete block, brick, stucco, wood.</td>
<td>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.</td>
<td>2-4 hr touch</td>
<td></td>
</tr>
<tr>
<td>ChemMasters, SpallGuard WB 10%, Chemically reactive Oligomeric Alkylalkoxy Siloxane</td>
<td>P</td>
<td>0</td>
<td>10</td>
<td>For horizontal or vertical, exterior/interior cured concrete and masonry at marine structures, vehicular repair and wash down facilities.</td>
<td>Siloxane water repellent for concree and masonry, prevents spalling of new concrete surfaces due to freeze/thaw cycling, seals pores.</td>
<td>24-48 hr touch</td>
<td></td>
</tr>
<tr>
<td>ChemMasters, Textured II, Textured 100% Acrylic Emulsion</td>
<td>FF</td>
<td>44</td>
<td>73</td>
<td>Used for interior or exterior, vertical or overhead concrete and masonry surfaces.</td>
<td>Superior color stability, excellent hiding power, resistant to stains and chemicals, will not crack, excellent hiding, resistant to dirt &amp; atmospheric pollutants.</td>
<td>2-4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Degussa/ChemRex, Thorooclear Special, Silicate</td>
<td>P</td>
<td>0</td>
<td>N/A</td>
<td>Vertical/horizontal concrete, aged limestone.</td>
<td>Penetrates, seals, water repellent, breathable</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Degussa/ChemRex, Thoroocast 200 WB 100% Acrylic E/E, Pigmented</td>
<td>FF</td>
<td>92</td>
<td>39</td>
<td>Concrete/masonry, plaster/stucco, gunitie/shotcrete, brick/stone for vertical and overhead surfaces.</td>
<td>Smooth waterproof coating, high light reflectivity (white)</td>
<td>1-2 hr touch</td>
<td></td>
</tr>
<tr>
<td>Degussa/ChemRex, Thoroocast DOT, Pigmented 100 % Acrylic</td>
<td>FF</td>
<td>58</td>
<td>49</td>
<td>Vertical and overhead concrete surfaces, DOT concrete structures, previously coated surfaces.</td>
<td>Resists wind driven rain, weathering, erosion and impact, water vapor permeable, recoatable, high-build, excellent hiding</td>
<td>1-2 hr touch</td>
<td></td>
</tr>
<tr>
<td>Degussa/ChemRex, Thoroocast F-74, Pigmented Acrylic</td>
<td>FF</td>
<td>56</td>
<td>50</td>
<td>Pedestrian traffic concrete decks, floors, walkways, stairs, swimming pool decks.</td>
<td>Skid, UV and weather resistant</td>
<td>24 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Degussa/ChemRex, Thorogard, Pigmented</td>
<td>FF</td>
<td>44</td>
<td>47</td>
<td>Exterior above grade walls, previously coated surfaces, aged stucco, concrete, plaster.</td>
<td>Flexible, breathable, UV, weather resistant, excellent hiding</td>
<td>5 hr touch</td>
<td></td>
</tr>
<tr>
<td>Degussa/ChemRex, Thoroglass, Clear WB Semi-Gloss Acrylic-Methacrylate Sealer</td>
<td>FF</td>
<td>75</td>
<td>N/A</td>
<td>Concrete, concrete aggregate panels, stucco, vertical surfaces, interior/ exterior.</td>
<td>Durable, non-yellowing, breathable, semi-gloss finish</td>
<td>2-4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Degussa/ChemRex, Thorolastic, Pigmented 100% Acrylic</td>
<td>FF</td>
<td>38-50</td>
<td>58</td>
<td>Exterior above grade concrete structures, brick and concrete masonry.</td>
<td>Excellent color retention and UV resistance, wind driven rain resistance, CO2 diffusion barrier, flexible, breathable,</td>
<td>6 hr touch</td>
<td></td>
</tr>
<tr>
<td>Degussa/ChemRex, Thoroosol, Cement-Based</td>
<td>FF</td>
<td>0</td>
<td>N/A</td>
<td>Concrete, block, brick, porous stone, basements and retaining walls, bridges, foundations, above and below grade.</td>
<td>Breathable, waterproof, covers defects and blemishes, resists both positive and negative hydrostatic pressure</td>
<td>60-90 min pot life 7-10 day cure</td>
<td></td>
</tr>
<tr>
<td>Degussa (ChemRex Inc/Sonneborne), Conipur II Deck Coating System, Conipur 78 Primer, Conipur 265/275 Z Base, Conipur 275 Top Coat</td>
<td>FF</td>
<td>10 P</td>
<td>5 B</td>
<td>Parking ramps, elevated concrete slabs, mechanical rooms, stadiums, plywood.</td>
<td>2 Component reactive cure, elastomeric polyurethane, protects from chloride intrusion, excellent chemical resistance and durability, superior abrasion resistance, resists chemicals</td>
<td>2 hr recoat for P 3-4 hr recoat for B 24 hr cure for all</td>
<td></td>
</tr>
<tr>
<td>Duron Paints &amp; Wallcoverings, 80-071 Dura Crete WB Waterproofing Sealer</td>
<td>FF</td>
<td>47</td>
<td>14</td>
<td>Above-grade concrete/masonry, stucco, brick, stone, adobe, drywall, plaster, roof tiles.</td>
<td>UV protected, waterproof sealer, alkali and mildew resistant, non-yellowing</td>
<td>45-60 min touch 4 hr recoat</td>
<td></td>
</tr>
<tr>
<td>Company</td>
<td>Product Name</td>
<td>Application Areas</td>
<td>Properties</td>
<td>Drying Time</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>EPMAR,</td>
<td>1500 Sta-Crete Epoxy Tank Lining, 2</td>
<td>Concrete, fiberglass and steel surfaces subject to continuous abrasion service,</td>
<td>Excellent adhesion, chemical resistance, dries to a resilient porcelain-type gloss film, self-priming, 20 minute pot life</td>
<td>6 hr recast</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>chlorine water immersion, salt water immersion such as fountains, aquariums, and</td>
<td></td>
<td>3 day cure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>water treatment facilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Everest Coatings,</td>
<td>Evercoat 7000S High Modulus Waterproof Pigmented Coating, 1</td>
<td>Concrete, masonry, stucco</td>
<td>Durable, UV, and mildew resistant; good adhesion to cement &amp; mortar</td>
<td>3 hr touch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12-24 hr recast</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Company</td>
<td>Product Description</td>
<td>FF</td>
<td>N/A</td>
<td>FF</td>
<td>N/A</td>
<td>N/A</td>
<td>P</td>
</tr>
<tr>
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</tr>
<tr>
<td>Monopole Inc,</td>
<td>7100 Monochem Elastoseal, Silicone Fortified, copolymerized with Polydimethylsiloxane Oligomers</td>
<td>P</td>
<td>20</td>
<td>N/A</td>
<td>50-150</td>
<td>Interior/Exterior, new or ole porous concrete, stucco and masonry surfaces</td>
<td>Long life (15-20 yrs), for damp and dry surfaces, breathable, control efflorescence, mildew and stains</td>
</tr>
<tr>
<td>Okon Inc,</td>
<td>OK-970 Watersstopper, Acrylic Emulsion/Glass Sphere Technology</td>
<td>FF</td>
<td>0</td>
<td>100</td>
<td>N/A</td>
<td>N/A</td>
<td>FF</td>
</tr>
<tr>
<td>Polycarb, Mark 87.6 Smooth Elastomeric Wall Pigmented Coating</td>
<td>FF</td>
<td>100</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Interior/Exterior, above or below grade basement walls, block walls, brick, foundations walls, retaining walls, stucco</td>
<td>Low abrasiveness, non-flammable, UV resistant, breathable, waterproofer</td>
</tr>
<tr>
<td>Polycarb, Mark 154, Pigmented Sealers 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Highway bridge decks</td>
<td>Flexible, de-slicking, non-porous, fast-curing.</td>
</tr>
<tr>
<td>Polycarb, Mark-163 Flexogrid, Pigmented Sealer 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Highway bridge decks</td>
<td>Flexible, de-slicking, non-porous, fast-curing.</td>
</tr>
<tr>
<td>RainGuard International Products Co,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resene Paints Limited, D62 X-200 Acrylic Waterproofing Membrane</td>
<td>FF</td>
<td>89</td>
<td>N/A</td>
<td>54-81</td>
<td>Concrete block, concrete surfaces, fiber cement</td>
<td>Very good abrasion and chemical resistance, excellent durability, superior void and crack filling</td>
<td>1 hr touch, 3 hr recoat</td>
</tr>
<tr>
<td>Samuel Cabot Inc, 1000 Cabot Waterproofing With Teflon Surface Protector, Silicone Emulsion</td>
<td>P</td>
<td>0</td>
<td>6</td>
<td>150-250</td>
<td>New or properly reconditioned wood including siding, shingles, decks, shakes, fences, roof, and log homes. Also brick, concrete, masonry, stone and unglazed tile</td>
<td>Unsurpassed water-proofing protection, mildew resistant, repels oil and grease staining, resistance to dirt pick-up and mildew</td>
<td>3 hr touch, 24 hr recoat</td>
</tr>
<tr>
<td>Seal-Krete Heavy Duty Waterproofer, High Solids Acrylic</td>
<td>P</td>
<td>15</td>
<td>25</td>
<td>50-300</td>
<td>Vertical surfaces only, stone, brick, adobe, wood fencing, plaster, drywall, galvanized metal, aluminum siding, masonry, binds chalky surfaces</td>
<td>Waterproofing, excellent adhesion, non-yellowing, flexible, breathable</td>
<td>2-4 hr touch, 2-4 hr recoat</td>
</tr>
<tr>
<td>Seal-Krete Original Waterproofer Sealer, Acrylic</td>
<td>P</td>
<td>8</td>
<td>10</td>
<td>200-300</td>
<td>Vertical concrete and masonry surfaces such as brick, block, stucco, plaster, stone and wood fencing, galvanized metal, aluminum siding</td>
<td>Non-yellowing, good adhesion and penetration, UV stable, breathable</td>
<td>2-4 hr touch, 2-4 hr recoat</td>
</tr>
<tr>
<td>Spectra-Tone Paint Corporation, #223 Zaptex Elasto-Coat High Build Waterproofing Coating, 100% Acrylic Elastomeric Emulsion Polymer</td>
<td>FF</td>
<td>100</td>
<td>52</td>
<td>41-82</td>
<td>Interior/exterior masonry, stucco, cement block, hallow tile, split face block, cinder block, sandblasted block or concrete, construction grade plywood or siding and most porous substrates.</td>
<td>Flexible with superior elongation, resists hydrolysis, UV stable, superior adhesion</td>
<td>1 hr touch, 24 hr recoat</td>
</tr>
<tr>
<td>Spectra-Tone Paint Corporation, #225 Zaptex HB Waterproofing Elastomeric Coating, 100% Acrylic Smooth Texture</td>
<td>FF</td>
<td>88</td>
<td>50</td>
<td>44-89</td>
<td>Interior/exterior masonry, stucco, cement block, hallow tile, split face block, cinder block, sandblasted block or concrete, construction grade plywood or siding and most porous substrates.</td>
<td>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</td>
<td>1 hr touch, 4 hr handle, 24 hr recoat</td>
</tr>
<tr>
<td>Tamms Industries</td>
<td>Baracade WB 244, Oligomeric Siloxane/silane</td>
<td>P</td>
<td>50</td>
<td>N/A</td>
<td>100-150</td>
<td>For concrete, horizontal and above-grade precast, poured-in-place, exposed aggregate, sidewalks, ramps, parking decks, bridge decks, floors</td>
<td>Ready to use, penetrating, water repellent, colorless, odorless, non-staining, non-yellowing, breathable, alkali resistant.</td>
</tr>
<tr>
<td>Company</td>
<td>Product Description</td>
<td>Availability</td>
<td>Coverage</td>
<td>Application</td>
<td>Description</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Tamms Industries</td>
<td>Chemstop WB Regular, Siloxane/silane</td>
<td>P</td>
<td>25</td>
<td>80-150</td>
<td>This water repellent is formulated for use on dense surfaces, such as pre-cast or poured-in-place concrete. Waterprofs concrete and masonry, water-based, VOC compliant, colorless, odorless, non-staining, non-yellowing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TK Products (Sierra Corp),</td>
<td>TK-1311 WB Silane Concentrate, Silicone Micro Emulsion based on Silane and Oligomeric Alkoxy silanes</td>
<td>P</td>
<td>59</td>
<td>6</td>
<td>Concrete</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>150</td>
<td></td>
<td>Seals and imparts water repellent to absorbent mineral building materials</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N/A = Not Available

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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 snapshot 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.
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 of total VOC emissions.

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

<table>
<thead>
<tr>
<th>Container Size</th>
<th>Total Gallons</th>
<th>Total VOC Emissions (lbs)</th>
<th>Total VOC Emissions (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>½ Pint</td>
<td>49</td>
<td>162.55</td>
<td>0.081</td>
</tr>
<tr>
<td>1 Pint</td>
<td>52</td>
<td>206.49</td>
<td>0.103</td>
</tr>
<tr>
<td>1 Quart</td>
<td>1,564</td>
<td>3,956.60</td>
<td>1.978</td>
</tr>
<tr>
<td>1 Gallon</td>
<td>11,099</td>
<td>21,473.34</td>
<td>10.737</td>
</tr>
<tr>
<td>5 gallon</td>
<td>11,485</td>
<td>17,032.08</td>
<td>8.516</td>
</tr>
<tr>
<td>Other Sizes (Lg)</td>
<td>1,128</td>
<td>1,750.07</td>
<td>0.875</td>
</tr>
<tr>
<td>Other Sizes (Sm)</td>
<td>8.60</td>
<td>0.004</td>
<td></td>
</tr>
<tr>
<td>Other Sizes (Sm)</td>
<td>86 Items</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Sizes (Lg)</td>
<td>113 Items</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Coating Categories
The 21,053 line items of the reported store 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

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

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

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**

<table>
<thead>
<tr>
<th>Category</th>
<th>Total Number of Coatings</th>
<th>Number of Coatings Meeting Current Limits</th>
<th>% Coatings Meeting Current Limits</th>
<th>Number of Coatings Exceeding Current Limits</th>
<th>Number of Coatings Meeting Future Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete-Curing Compounds</td>
<td>26</td>
<td>26</td>
<td>100%</td>
<td>0</td>
<td>26</td>
</tr>
<tr>
<td>Mastic Coatings</td>
<td>13</td>
<td>13</td>
<td>100%</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Multi-Colored Coatings</td>
<td>30</td>
<td>30</td>
<td>100%</td>
<td>0</td>
<td>30</td>
</tr>
</tbody>
</table>
Table-5 shows the 10 coating categories with the smallest percentage of products meeting current 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

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

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.
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)

<table>
<thead>
<tr>
<th>Size Container</th>
<th>No of Products</th>
<th>% of Small Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>Half Pint</td>
<td>783</td>
<td>10.4%</td>
</tr>
<tr>
<td>1-Pint</td>
<td>416</td>
<td>5.5%</td>
</tr>
<tr>
<td>1-Quart</td>
<td>6,254</td>
<td>83.1%</td>
</tr>
<tr>
<td>Odd Size (Sm)</td>
<td>72</td>
<td>1.0%</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Size Container</th>
<th>SC Exempted</th>
<th>SC Non-Exempted</th>
<th>Undeclared</th>
<th>% SC Exempted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Half Pint</td>
<td>183</td>
<td>211</td>
<td>0</td>
<td>87%</td>
</tr>
<tr>
<td>1-Pint</td>
<td>86</td>
<td>209</td>
<td>32</td>
<td>41%</td>
</tr>
<tr>
<td>1-Quart</td>
<td>572</td>
<td>2,114</td>
<td>126</td>
<td>27%</td>
</tr>
</tbody>
</table>

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 than 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

<table>
<thead>
<tr>
<th>Coating Category</th>
<th>Number of Products</th>
<th>1 Pint Size</th>
<th>1 Qt Size</th>
<th>1 Gal Size</th>
<th>1.5 Gal Size</th>
<th>2 Gal Size</th>
<th>3 Gal Size</th>
<th>4 Gal Size</th>
<th>5 Gal Size</th>
<th>10 Gal Size</th>
<th>55 Gal Size</th>
<th>Total Amount of Product Sold (gal)</th>
<th>VOC Emission (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCC</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>4.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Flat</td>
<td>17</td>
<td>0</td>
<td>5</td>
<td>8</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>11.3</td>
<td>0.6</td>
<td>0.1</td>
</tr>
<tr>
<td>Faux</td>
<td>7</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>4.5</td>
<td>1.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Floor</td>
<td>241</td>
<td>0</td>
<td>0</td>
<td>78</td>
<td>7</td>
<td>42</td>
<td>1</td>
<td>413</td>
<td>0</td>
<td>0</td>
<td>173.5</td>
<td>1.5</td>
<td>0.1</td>
</tr>
<tr>
<td>IMC-PT</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>MC</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>NE</td>
<td>26</td>
<td>15</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3.9</td>
<td>0.5</td>
<td>0.1</td>
</tr>
<tr>
<td>PSLI</td>
<td>52</td>
<td>2</td>
<td>5</td>
<td>24</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>14</td>
<td>1</td>
<td>0</td>
<td>237.0</td>
<td>1.2</td>
<td>0.1</td>
</tr>
<tr>
<td>QD-PSU</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1.3</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>RC</td>
<td>78</td>
<td>0</td>
<td>19</td>
<td>45</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>0</td>
<td>0</td>
<td>49.5</td>
<td>0.9</td>
<td>0.8</td>
</tr>
<tr>
<td>Stain</td>
<td>42</td>
<td>0</td>
<td>0</td>
<td>36</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>36.0</td>
<td>2.6</td>
<td>0.2</td>
</tr>
<tr>
<td>TC</td>
<td>33</td>
<td>0</td>
<td>5</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>21</td>
<td>0</td>
<td>0</td>
<td>8.3</td>
<td>3.0</td>
<td>0.2</td>
</tr>
<tr>
<td>WCMS</td>
<td>15</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>71.3</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>WS</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>520</td>
<td>17</td>
<td>46</td>
<td>211</td>
<td>10</td>
<td>46</td>
<td>2</td>
<td>3</td>
<td>183</td>
<td>1</td>
<td>1</td>
<td>1104.6</td>
<td>10.2</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Coating Category</th>
<th>Prior VOC Limit Date (VOC)</th>
<th>Current VOC Limit Date (VOC)</th>
<th>3 Year Sell Through Protected?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bond Breakers</td>
<td>11/08/96 (350 gpl)</td>
<td>07/09/04 (350 gpl)</td>
<td>Possible</td>
</tr>
<tr>
<td>Clear Wood Finishes-</td>
<td>01/01/98 (680 gpl)</td>
<td>01/01/05 (275 gpl)</td>
<td>Possible</td>
</tr>
<tr>
<td>Lacquers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear Wood Finishes-</td>
<td>11/08/96 (350 gpl)</td>
<td>07/09/04 (350 gpl)</td>
<td>Possible</td>
</tr>
<tr>
<td>Varnishes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear Wood Finishes-</td>
<td>11/08/96 (350 gpl)</td>
<td>07/09/04 (350 gpl)</td>
<td>Possible</td>
</tr>
<tr>
<td>Sanding Sealers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear Wood Finishes-</td>
<td>01/01/98 (550 gpl)</td>
<td>01/01/05 (275 gpl)</td>
<td>Possible</td>
</tr>
<tr>
<td>Lacquers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear Brushing</td>
<td>11/08/96 (680 gpl)</td>
<td>07/09/04 (680 gpl)</td>
<td>Possible</td>
</tr>
<tr>
<td>Lacquer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concrete-Curing</td>
<td>11/08/96 (350 gpl)</td>
<td>07/09/04 (350 gpl)</td>
<td>Possible</td>
</tr>
<tr>
<td>Compounds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry-Fog Coatings</td>
<td>11/08/96 (350-400 gpl)</td>
<td>07/09/04 (400 gpl)</td>
<td>Possible</td>
</tr>
<tr>
<td>Fire-Proofing Exterior Coatings</td>
<td>11/08/96 (450 gpl)</td>
<td>01/01/99 (350 gpl)</td>
<td>Expired</td>
</tr>
<tr>
<td>Coating Category</td>
<td>Prior VOC Limit Date (VOC)</td>
<td>Current VOC Limit Date (VOC)</td>
<td>3 Year Sell Through Protected?</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>----------------------------</td>
<td>-----------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Flat Coatings</td>
<td>11/08/96 (250 gpl)</td>
<td>07/01/01 (100 gpl)</td>
<td>Expired</td>
</tr>
<tr>
<td>Floor Coatings</td>
<td>11/08/96 (420 gpl)</td>
<td>01/01/03 (100 gpl)</td>
<td>Possible</td>
</tr>
<tr>
<td>Graphic Arts (sign) Coatings</td>
<td>11/08/96 (350 gpl)</td>
<td>07/09/04 (350 gpl)</td>
<td>Possible</td>
</tr>
<tr>
<td>High Temperature IM Coatings</td>
<td>11/08/96 (420 gpl)</td>
<td>01/01/03 (420 gpl)</td>
<td>Possible</td>
</tr>
<tr>
<td>Zinc-Rich IM Coatings</td>
<td>11/08/96 (240 gpl)</td>
<td>01/01/03 (240 gpl)</td>
<td>Possible</td>
</tr>
<tr>
<td>Industrial Maintenance Coatings</td>
<td>11/08/96 (240 gpl)</td>
<td>01/01/04 (250 gpl)</td>
<td>Possible</td>
</tr>
<tr>
<td>Japans/Faux Finishes Coatings</td>
<td>11/08/96 (700 gpl)</td>
<td>01/01/99 (350 gpl)</td>
<td>Expired</td>
</tr>
<tr>
<td>Magnesite Cement Coatings</td>
<td>11/08/96 (600 gpl)</td>
<td>01/01/99 (450 gpl)</td>
<td>Expired</td>
</tr>
<tr>
<td>Mastic Coatings</td>
<td>11/08/96 (300 gpl)</td>
<td>07/09/04 (300 gpl)</td>
<td>Possible</td>
</tr>
<tr>
<td>Metallic Pigmented Coatings</td>
<td>11/08/96 (500 gpl)</td>
<td>07/09/04 (500 gpl)</td>
<td>Possible</td>
</tr>
<tr>
<td>Multi-Color Coatings</td>
<td>11/08/96 (420 gpl)</td>
<td>01/01/98 (250 gpl)</td>
<td>Expired</td>
</tr>
<tr>
<td>Non-Flat Coatings</td>
<td>01/01/03 (150 gpl)</td>
<td>07/09/04 (150 gpl)</td>
<td>Possible</td>
</tr>
<tr>
<td>Pigmented Lacquers</td>
<td>11/08/96 (680 gpl)</td>
<td>01/01/98 (550 gpl)</td>
<td>Expired</td>
</tr>
</tbody>
</table>
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

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

**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

<table>
<thead>
<tr>
<th>Group 1: High Gloss Non-flats</th>
<th>Published VOC</th>
<th>Grouping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product A 242 g/L &gt; 50g/L</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Product B 149 g/L &gt; 50g/L</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Product C 47 g/L ≤ 50g/L</td>
<td>L</td>
<td></td>
</tr>
<tr>
<td>Product D 0 g/L ≤ 50g/L</td>
<td>L</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 2: Med. Gloss Non-flats</th>
<th>Published VOC</th>
<th>Grouping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product E 150 g/L &gt; 50g/L</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Product F 144 g/L &gt; 50g/L</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Product G 0 g/L ≤ 50g/L</td>
<td>L</td>
<td></td>
</tr>
<tr>
<td>Product H 0 g/L ≤ 50g/L</td>
<td>L</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 3: Low Gloss Non-flats</th>
<th>Published VOC</th>
<th>Grouping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product I 150 g/L &gt; 50g/L</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Product J 112 g/L &gt; 50g/L</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Product K &lt;50 g/L ≤ 50g/L</td>
<td>L</td>
<td></td>
</tr>
<tr>
<td>Product L 49 g/L ≤ 50g/L</td>
<td>L</td>
<td></td>
</tr>
</tbody>
</table>

### Number of Products Tested by Published VOC Range

<table>
<thead>
<tr>
<th>Category</th>
<th>Products &gt;50g/L</th>
<th>Products ≤50g/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Gloss Non-flats</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Medium Gloss Non-flats</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Low Gloss Non-flats</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

### Tests for General Properties Summary

#### Percent Nonvolatile Summary

<table>
<thead>
<tr>
<th>Group 1: High Gloss Non-flats</th>
<th>Published VOC</th>
<th>Grouping</th>
<th>Percent Nonvolatile Experimental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product A 242 g/L &gt; 50g/L</td>
<td>H</td>
<td>42.72</td>
<td></td>
</tr>
<tr>
<td>Product B 149 g/L &gt; 50g/L</td>
<td>H</td>
<td>51.02</td>
<td></td>
</tr>
<tr>
<td>Product C 47 g/L ≤ 50g/L</td>
<td>L</td>
<td>49.75</td>
<td></td>
</tr>
<tr>
<td>Product D 0 g/L ≤ 50g/L</td>
<td>L</td>
<td>48.49</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 2: Med. Gloss Non-flats</th>
<th>Published VOC</th>
<th>Grouping</th>
<th>Percent Nonvolatile Experimental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product E 150 g/L &gt; 50g/L</td>
<td>H</td>
<td>46.11</td>
<td></td>
</tr>
<tr>
<td>Product F 144 g/L &gt; 50g/L</td>
<td>H</td>
<td>48.55</td>
<td></td>
</tr>
<tr>
<td>Product G 0 g/L ≤ 50g/L</td>
<td>L</td>
<td>52.34</td>
<td></td>
</tr>
<tr>
<td>Product H 0 g/L ≤ 50g/L</td>
<td>L</td>
<td>42.75</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 3: Low Gloss Non-flats</th>
<th>Published VOC</th>
<th>Grouping</th>
<th>Percent Nonvolatile Experimental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product I 150 g/L &gt; 50g/L</td>
<td>H</td>
<td>52.93</td>
<td></td>
</tr>
<tr>
<td>Product J 112 g/L &gt; 50g/L</td>
<td>H</td>
<td>49.26</td>
<td></td>
</tr>
<tr>
<td>Product K &lt;50 g/L ≤ 50g/L</td>
<td>L</td>
<td>52.23</td>
<td></td>
</tr>
<tr>
<td>Product L 49 g/L ≤ 50g/L</td>
<td>L</td>
<td>52.82</td>
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</table>
# Stability Summary

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Stormer (original)</th>
<th>Stormer (post-test)</th>
<th>Overall Character</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 1:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Gloss Non-flats</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product A</td>
<td>H</td>
<td>74</td>
<td>Failure*</td>
</tr>
<tr>
<td>Product B</td>
<td>H</td>
<td>103</td>
<td>93</td>
</tr>
<tr>
<td>Product C</td>
<td>L</td>
<td>109</td>
<td>89</td>
</tr>
<tr>
<td>Product D</td>
<td>L</td>
<td>104</td>
<td></td>
</tr>
<tr>
<td><strong>Group 2:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Med. Gloss Non-flats</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product E</td>
<td>H</td>
<td>106</td>
<td>99</td>
</tr>
<tr>
<td>Product F</td>
<td>H</td>
<td>103</td>
<td>94</td>
</tr>
<tr>
<td>Product G</td>
<td>L</td>
<td>108</td>
<td>103</td>
</tr>
<tr>
<td>Product H</td>
<td>L</td>
<td>113</td>
<td>105</td>
</tr>
<tr>
<td><strong>Group 3:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Gloss Non-flats</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product I</td>
<td>H</td>
<td>101</td>
<td>103</td>
</tr>
<tr>
<td>Product J</td>
<td>H</td>
<td>94</td>
<td>99</td>
</tr>
<tr>
<td>Product K</td>
<td>L</td>
<td>106</td>
<td>113</td>
</tr>
<tr>
<td>Product L</td>
<td>L</td>
<td>95</td>
<td></td>
</tr>
</tbody>
</table>

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

---

**Stability Summary - Gloss Measurements**

<table>
<thead>
<tr>
<th>Grouping</th>
<th>20°Mean</th>
<th>20 SD</th>
<th>60°Mean</th>
<th>60 SD</th>
<th>85°Mean</th>
<th>85 SD</th>
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<tbody>
<tr>
<td><strong>Group 1:</strong></td>
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<td></td>
</tr>
<tr>
<td>High Gloss Non-flats</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product A</td>
<td>H</td>
<td>23.9</td>
<td>0.2</td>
<td>63.7</td>
<td>0.2</td>
<td>92.9</td>
</tr>
<tr>
<td>Product B</td>
<td>H</td>
<td>68.3</td>
<td>0.6</td>
<td>85.2</td>
<td>0.2</td>
<td>95.4</td>
</tr>
<tr>
<td>Product C</td>
<td>L</td>
<td>4.7</td>
<td>0.2</td>
<td>31.2</td>
<td>0.2</td>
<td>79.5</td>
</tr>
<tr>
<td>Product D</td>
<td>L</td>
<td>1.3</td>
<td>0.1</td>
<td>4.9</td>
<td>0.1</td>
<td>26.2</td>
</tr>
<tr>
<td><strong>Group 2:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Med. Gloss Non-flats</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product E</td>
<td>H</td>
<td>8.5</td>
<td>0.2</td>
<td>45.3</td>
<td>0.4</td>
<td>84.3</td>
</tr>
<tr>
<td>Product F</td>
<td>H</td>
<td>2.4</td>
<td>0.1</td>
<td>22.2</td>
<td>0.2</td>
<td>83.5</td>
</tr>
<tr>
<td>Product G</td>
<td>L</td>
<td>2.4</td>
<td>0.1</td>
<td>20.6</td>
<td>0.2</td>
<td>51.7</td>
</tr>
<tr>
<td>Product H</td>
<td>L</td>
<td>4.7</td>
<td>0.2</td>
<td>31.2</td>
<td>0.2</td>
<td>79.5</td>
</tr>
<tr>
<td><strong>Group 3:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Gloss Non-flats</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product I</td>
<td>H</td>
<td>4.2</td>
<td>0.2</td>
<td>29.7</td>
<td>0.6</td>
<td>71.9</td>
</tr>
<tr>
<td>Product J</td>
<td>H</td>
<td>1.3</td>
<td>0.1</td>
<td>4.9</td>
<td>0.1</td>
<td>26.2</td>
</tr>
<tr>
<td>Product K</td>
<td>L</td>
<td>1.4</td>
<td>0.1</td>
<td>4.3</td>
<td>0.1</td>
<td>25.3</td>
</tr>
<tr>
<td>Product L</td>
<td>L</td>
<td>95</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*No draw-downs were done of the failed paints*
## Stormer and Cone and Plate Viscosities Summary

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Stormer (KU)</th>
<th>Cone and Plate (P)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Temp. (°C)</td>
<td>Average Temp (°C)</td>
</tr>
<tr>
<td><strong>Group 1: High Gloss Non-flats</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product A</td>
<td>H 74</td>
<td>25</td>
</tr>
<tr>
<td>Product B</td>
<td>H 103</td>
<td>25</td>
</tr>
<tr>
<td>Product C</td>
<td>L 109</td>
<td>25</td>
</tr>
<tr>
<td>Product D</td>
<td>L 104</td>
<td>25</td>
</tr>
<tr>
<td><strong>Group 2: Med. Gloss Non-flats</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product E</td>
<td>H 106</td>
<td>25</td>
</tr>
<tr>
<td>Product F</td>
<td>H 103</td>
<td>25</td>
</tr>
<tr>
<td>Product G</td>
<td>L 108</td>
<td>25</td>
</tr>
<tr>
<td>Product H</td>
<td>L 113</td>
<td>25</td>
</tr>
<tr>
<td><strong>Group 3: Low Gloss Non-flats</strong></td>
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</tr>
<tr>
<td>Product I</td>
<td>H 101</td>
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</tr>
<tr>
<td>Product J</td>
<td>H 94</td>
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<td>Product K</td>
<td>L 106</td>
<td>25</td>
</tr>
<tr>
<td>Product L</td>
<td>L 95</td>
<td>25</td>
</tr>
</tbody>
</table>

Spindle = 3, Shear Rate = 12000s⁻¹

## Freeze-Thaw Resistance: Pass/Fail Summary

<table>
<thead>
<tr>
<th>Grouping</th>
<th>After 1 Cycle</th>
<th>After 3 Cycles</th>
<th>After 5 Cycles</th>
<th>After 8 Cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 1: High Gloss Non-flats</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product A</td>
<td>H Pass</td>
<td>Fail</td>
<td>Fail</td>
<td>Fail</td>
</tr>
<tr>
<td>Product B</td>
<td>H Pass</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
</tr>
<tr>
<td>Product C</td>
<td>L Pass</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
</tr>
<tr>
<td>Product D</td>
<td>L Fail</td>
<td>Fail</td>
<td>Fail</td>
<td>Fail</td>
</tr>
<tr>
<td><strong>Group 2: Med. Gloss Non-flats</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product E</td>
<td>H Pass</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
</tr>
<tr>
<td>Product F</td>
<td>H Pass</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
</tr>
<tr>
<td>Product G</td>
<td>L Pass</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
</tr>
<tr>
<td>Product H</td>
<td>L Pass</td>
<td>Fail</td>
<td>Fail</td>
<td>Fail</td>
</tr>
<tr>
<td><strong>Group 3: Low Gloss Non-flats</strong></td>
<td></td>
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</tr>
<tr>
<td>Product I</td>
<td>H Pass</td>
<td>Pass</td>
<td>Pass</td>
<td>Fail</td>
</tr>
<tr>
<td>Product J</td>
<td>H Pass</td>
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<td>Fail</td>
<td>Fail</td>
</tr>
<tr>
<td>Product K</td>
<td>L Pass</td>
<td>Fail</td>
<td>Fail</td>
<td>Fail</td>
</tr>
<tr>
<td>Product L</td>
<td>L Fail</td>
<td>Fail</td>
<td>Fail</td>
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</table>
### Mechanical Dry Time Summary*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Set-Touch</th>
<th>Tack-Free</th>
<th>Dry-Hard</th>
<th>Dry-Through</th>
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*Average values; times in minutes; stylus diameter = 1mm; speed = 6 hours

### Ambient Dry Time Summary*

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<th>Tack-Free</th>
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<td>&gt;500</td>
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*Times are in minutes, and are the average of two samples
## Gloss Summary

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<th>60° SD</th>
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*Average values

## Hide Summary – Contrast Ratio

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*Average values
### Tests for Non-Flat Paints Summary

#### Scrub Resistance Summary*

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*The standard is Sherwin Williams’ Harmony

#### Stain Resistance – ΔE Summary*

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*Average values*
### Stain Resistance – Gloss Summary*

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<th>60° SD</th>
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<td>0.6/0.6</td>
<td>94.4/93.9</td>
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<td>L</td>
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<td></td>
</tr>
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*All values written as: left value = washed area (no stain), right value = stained area

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### Washed Area (no stain) / Washed Area – Mustard

<table>
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<tr>
<th>Grouping</th>
<th>20° Mean</th>
<th>20° SD</th>
<th>60° Mean</th>
<th>60° SD</th>
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<th>85° SD</th>
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</tr>
<tr>
<td>Product A</td>
<td>H</td>
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<td>84.0/84.9</td>
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<td>92.8/93.9</td>
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<td>L</td>
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<td>57.1/58.9</td>
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</tr>
<tr>
<td>Product E</td>
<td>H</td>
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<td>Product F</td>
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<td>17.1/18.8</td>
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<td>Product H</td>
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<td>68.2/69.1</td>
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<td>6.5/6.6</td>
<td>0.1/0.1</td>
<td>29.0/30.2</td>
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<td>L</td>
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<td>0.1/0.1</td>
<td>28.3/30.1</td>
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<td>5.4/6.1</td>
<td>0.1/0.2</td>
<td>18.3/22.1</td>
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*All values written as: left value = washed area (no stain), right value = stained area

---

### Washed Area (no stain) / Washed Area – Wine

<table>
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<tr>
<th>Grouping</th>
<th>20° Mean</th>
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<th>60° Mean</th>
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<tr>
<td>Product</td>
<td>Group</td>
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<td>Washed Area – Carbon Black</td>
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<td>20° SD</td>
<td>60° Mean</td>
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<td>Product A</td>
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<td>76.8/76.3</td>
<td>0.4/2.6</td>
<td>83.4/82.3</td>
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<td>Product B</td>
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<td>69.7/70.7</td>
<td>0.8/0.4</td>
<td>87.4/88.9</td>
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<tr>
<td>Product C</td>
<td>L</td>
<td>46.5/49.9</td>
<td>0.6/1.8</td>
<td>83.6/83.9</td>
<td>0.6/0.8</td>
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<td>Product D</td>
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<td>58.9/60.8</td>
<td>0.2/2.0</td>
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<td>53.0/53.1</td>
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<td>Product F</td>
<td>H</td>
<td>18.7/20.8</td>
<td>0.2/0.8</td>
<td>62.1/63.7</td>
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<td>14.2/13.1</td>
<td>1.6/1.0</td>
<td>41.3/42.2</td>
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<td>Product H</td>
<td>L</td>
<td>3.3/3.3</td>
<td>0.1/0.2</td>
<td>24.4/25.1</td>
<td>0.2/0.4</td>
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<td>H</td>
<td>3.8/3.9</td>
<td>0.2/0.2</td>
<td>28.9/30.2</td>
<td>0.6/0.6</td>
<td>69.9/70.9</td>
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<tr>
<td>Product J</td>
<td>H</td>
<td>1.5/1.4</td>
<td>0.1/0.1</td>
<td>6.4/6.9</td>
<td>0.1/0.1</td>
<td>28.7/34.6</td>
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<tr>
<td>Product K</td>
<td>L</td>
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<td>0.1/0.1</td>
<td>6.5/6.7</td>
<td>0.2/0.1</td>
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<td>L</td>
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<td>5.3/6.1</td>
<td>0.1/0.1</td>
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*All values written as: left value = washed area (no stain), right value = stained area

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### Blocking Resistance Summary

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<tr>
<td>Product A</td>
<td>H</td>
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<tr>
<td>Product B</td>
<td>H</td>
</tr>
<tr>
<td>Product C</td>
<td>L</td>
</tr>
<tr>
<td>Product D</td>
<td>L</td>
</tr>
<tr>
<td><strong>Group 2:</strong> Med. Gloss Non-Flats</td>
<td></td>
</tr>
<tr>
<td>Product E</td>
<td>H</td>
</tr>
<tr>
<td>Product F</td>
<td>H</td>
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</table>
**Group 3:** Low Gloss Non-Flats

<table>
<thead>
<tr>
<th>Product</th>
<th>Flow</th>
<th>Level</th>
<th>Sag</th>
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<tbody>
<tr>
<td>Product I</td>
<td>H</td>
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<td>9</td>
</tr>
<tr>
<td>Product J</td>
<td>H</td>
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<tr>
<td>Product K</td>
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<td>9</td>
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<tr>
<td>Product L</td>
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*Average Values

**Flow/Level and Sag Summary***

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<tr>
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<tr>
<td>Product B</td>
<td>H</td>
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<tr>
<td>Product C</td>
<td>L</td>
<td>6</td>
</tr>
<tr>
<td>Product D</td>
<td>L</td>
<td>6</td>
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<td><strong>Group 2:</strong> Med. Gloss Non-flats</td>
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<td>Product E</td>
<td>H</td>
<td>5</td>
</tr>
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<td>Product F</td>
<td>H</td>
<td>4</td>
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<tr>
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<td>L</td>
<td>5</td>
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<td>Product H</td>
<td>L</td>
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<tr>
<td>Product I</td>
<td>H</td>
<td>4</td>
</tr>
<tr>
<td>Product J</td>
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<td>Product L</td>
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*Average Values

**QUV Summary – Color Change***

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<th>ΔE, 600 Hours</th>
<th>ΔE, 800 Hours</th>
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<tbody>
<tr>
<td><strong>Group 1:</strong> High Gloss Non-flats</td>
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<tr>
<td>Product A</td>
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<td>Product B</td>
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<td>Product D</td>
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<td>0.73</td>
<td>0.88</td>
<td>0.85</td>
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<tr>
<td>Product E</td>
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<td>0.19</td>
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<td>Product I</td>
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<td>0.18</td>
<td>0.23</td>
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</tr>
<tr>
<td><strong>Product K</strong></td>
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<td>0.45</td>
<td>0.43</td>
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<td>0.65</td>
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*Average values*
<table>
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<tr>
<th>Group 1:</th>
<th>Group</th>
<th>20°Mean</th>
<th>20 SD</th>
<th>60°Mean</th>
<th>60 SD</th>
<th>85°Mean</th>
<th>85 SD</th>
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<tbody>
<tr>
<td>High Gloss Non-flats</td>
<td>Product A</td>
<td>H</td>
<td>46.3/11.9</td>
<td>0.2/3.9</td>
<td>79.1/50.7</td>
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<td>97.9/91.3</td>
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<td></td>
<td>Product B</td>
<td>H</td>
<td>34.4/6.2</td>
<td>0.2/0.7</td>
<td>69.4/40.6</td>
<td>0.2/1.5</td>
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<td></td>
<td>Product C</td>
<td>L</td>
<td>70.8/20.7</td>
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<td>85.8/68.7</td>
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<td>Product E</td>
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<td>0.4/0.3</td>
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<td>24.9/10.1</td>
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<td>0.1/0.3</td>
<td>13.9/28.1</td>
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</table>

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

**All values are averages

### Surface Tension Summary

<table>
<thead>
<tr>
<th>Group 1:</th>
<th>Grouping</th>
<th>Corrected Surface Tension*</th>
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</thead>
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<tr>
<td>High Gloss Non-flats</td>
<td>Product A</td>
<td>H</td>
</tr>
<tr>
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<td>Product B</td>
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<td></td>
<td>Product C</td>
<td>L</td>
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<td>Product D</td>
<td>L</td>
</tr>
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<td>Med. Gloss Non-flats</td>
<td>Product E</td>
</tr>
<tr>
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<td>Product F</td>
<td>H</td>
</tr>
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<td>Product G</td>
<td>L</td>
</tr>
<tr>
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<td>Product H</td>
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<td>Product J</td>
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</tr>
<tr>
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<td>Product L</td>
<td>L</td>
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</table>

*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

<table>
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<tr>
<th>Property</th>
<th>Standard</th>
<th>Number of Replicates</th>
<th>Substrate</th>
<th>Film Thickness/Bar Type</th>
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<tr>
<td>Freeze-Thaw Resistance</td>
<td>ASTM D2243-95</td>
<td>3</td>
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<tr>
<td>Dry Time - Mechanical</td>
<td>ASTM D5895-03</td>
<td>2</td>
<td>Glass</td>
<td>3mil Cube Applicator</td>
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<tr>
<td>Dry Time</td>
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<tr>
<td>Gloss</td>
<td>ASTM D523-89</td>
<td>2</td>
<td>Leneta Card 1-B</td>
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<tr>
<td>Hide</td>
<td>Spectrophotometer</td>
<td>4</td>
<td>Leneta Card 1-B</td>
<td>3mil/Bird bar 2mil/Bird bar</td>
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</table>

### Tests for Non-flat Paints

<table>
<thead>
<tr>
<th>Property</th>
<th>Standard</th>
<th>Number of Replicates</th>
<th>Substrate</th>
<th>Film Thickness/Bar Type</th>
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<tbody>
<tr>
<td>Scrub Resistance</td>
<td>ASTM D2486-00</td>
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<td>Plastic</td>
<td>7 mil/Dow bar</td>
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<tr>
<td>Stain Resistance</td>
<td>ASTM D4828 mod.</td>
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<td>Plastic</td>
<td>7 mil/Dow bar</td>
</tr>
<tr>
<td>Blocking Resistance</td>
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<td>3</td>
<td>Leneta Card 2-C</td>
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<tr>
<td>Flow &amp; Leveling</td>
<td>ASTM D4062-99</td>
<td>3</td>
<td>Leneta Card 1-B</td>
<td>NPCA Bar</td>
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<tr>
<td>Sag</td>
<td>ASTM D4400-99</td>
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<td>Leneta Card 1-B</td>
<td>Anti-Sag meter</td>
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<tr>
<td>QUV</td>
<td>ASTM D4587-01</td>
<td>3</td>
<td>Aluminum</td>
<td>#44 Wire Wound</td>
</tr>
<tr>
<td>Surface Tension</td>
<td>ASTM D1331-89</td>
<td>3</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
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 1200 s⁻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 analogous 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**

<table>
<thead>
<tr>
<th>Group</th>
<th>Pub. VOC</th>
<th>Grouping</th>
<th>3 Replicates Each</th>
<th>V (%vol)</th>
<th>AVG V</th>
<th>N (%NV)</th>
<th>AVG N</th>
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<tr>
<td><strong>Group 1:</strong> High Gloss Nonflats</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
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<td>1.7054</td>
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<td>57.38</td>
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<td>1.7211</td>
<td>0.5046</td>
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<td>Replicate 3</td>
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<td>1.7186</td>
<td>0.5072</td>
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<td></td>
<td></td>
<td>42.86</td>
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<td>1.7004</td>
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<td>48.87</td>
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<tr>
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<td>1.7247</td>
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<td>Product J</td>
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<td>&gt; 50g/L</td>
<td>H</td>
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<td>Product K</td>
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<td>≤ 50g/L</td>
<td>L</td>
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<td>1.7511</td>
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<td>Product L</td>
<td>49 g/L</td>
<td>≤ 50g/L</td>
<td>L</td>
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<td>1.7422</td>
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### Stability

<table>
<thead>
<tr>
<th>Group 1:</th>
<th>Pub. VOC</th>
<th>HighGloss</th>
<th>Weight</th>
<th>Time</th>
<th>Press</th>
<th>Low.Layer</th>
<th>Viscosity</th>
<th>Temp</th>
<th>Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product A</td>
<td>242 g/L</td>
<td>H</td>
<td>631.2g</td>
<td>30 days</td>
<td>631.2</td>
<td>Failure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product B</td>
<td>149 g/L</td>
<td>H</td>
<td>644.4</td>
<td>30 days</td>
<td>644.3</td>
<td>10 93</td>
<td>25°C</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Product C</td>
<td>47 g/L</td>
<td>L</td>
<td>623.1</td>
<td>30 days</td>
<td>623</td>
<td>10 89</td>
<td>25°C</td>
<td>8</td>
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<tr>
<td>Product D</td>
<td>0 g/L</td>
<td>L</td>
<td>635.7</td>
<td>30 days</td>
<td>635.6</td>
<td>Failure</td>
<td></td>
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<td></td>
</tr>
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</table>

**Group 2: Med.Gloss**

| Product E       | 150 g/L  | H         | 645    | 30 days | 645   | 6   6 99 | 25°C | 7         |
| Product F       | 144 g/L  | H         | 658    | 30 days | 658   | 8   6 94 | 25°C | 6         |
| Product G       | 0 g/L    | L         | 709.8  | 30 days | 709.8 | 8   6 103 | 25°C | 6         |
| Product H       | 0 g/L    | L         | 643.7  | 30 days | 643.7 | 8   6 105 | 25°C | 6         |

**Group 3: LowGloss**

| Product I       | 150 g/L  | H         | 685.9  | 30 days | 685.9 | 10 8 103 | 25°C | 10        |
| Product J       | 112 g/L  | H         | 683.4  | 30 days | 683.4 | 8   8 99 | 25°C | 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

<table>
<thead>
<tr>
<th>Pub. VOC</th>
<th>Gloss (5 readings per replicate)</th>
</tr>
</thead>
<tbody>
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<td><strong>Group 1:</strong> HighGloss</td>
<td>20°Mean</td>
</tr>
<tr>
<td>Product A</td>
<td>242 g/L</td>
</tr>
<tr>
<td>Product B</td>
<td>149 g/L</td>
</tr>
<tr>
<td>Product C</td>
<td>144 g/L</td>
</tr>
<tr>
<td>Product D</td>
<td>0 g/L</td>
</tr>
<tr>
<td><strong>Group 2:</strong> Med.Gloss</td>
<td>--------</td>
</tr>
<tr>
<td>Product E</td>
<td>150 g/L</td>
</tr>
<tr>
<td>Product F</td>
<td>112 g/L</td>
</tr>
<tr>
<td>Product G</td>
<td>&lt;50 g/L</td>
</tr>
<tr>
<td>Product L</td>
<td>49 g/L</td>
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**Stommer Viscosity and Cone and Plate Viscosity**

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<th>VOC Grouping</th>
<th>Stormer (KU)</th>
<th></th>
<th>Cone and Plate (P)</th>
<th></th>
<th></th>
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<tbody>
<tr>
<td><strong>Group 1:</strong></td>
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<td>Temp</td>
<td>Temp</td>
<td>Temp</td>
<td></td>
<td>Temp</td>
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<td>(°C)</td>
<td>(°C)</td>
<td>(°C)</td>
<td></td>
<td>(°C)</td>
</tr>
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<td>74</td>
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<td>103</td>
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<td>Product F 144 g/L &gt; 50 g/L H</td>
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<td>10 13 34 &gt;300</td>
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### Dry-Time – Ambient

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<th>Dust-Free</th>
<th>Tack-Free</th>
<th>Dry-Hard</th>
<th>Dry-Through</th>
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<td>&gt;500</td>
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**QUV – Gloss – 600 Hours**

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| Replicate 2 | 3.7 | 0.1 | 28.1 | 0.2 | 80.1 | 0.4 |
| 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 B | 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 C | 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 D | 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 |
| Product A | 3.0 | 0.2 | 25.4 | 0.2 | 75.1 | 0.2 |
| Replicate 2 | 3.1 | 0.2 | 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 B | 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 C | 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 |
### QUV – Gloss – 800 Hours

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<td>Replicate 3</td>
<td>12:28</td>
<td>25</td>
</tr>
<tr>
<td>Product D</td>
<td>0 g/L</td>
<td>≤ 50g/L</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>12:56</td>
<td>25</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>12:50</td>
<td>25</td>
</tr>
<tr>
<td>Product E</td>
<td>150 g/L</td>
<td>&gt; 50g/L</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>13:47</td>
<td>25</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>13:49</td>
<td>25</td>
</tr>
<tr>
<td>Product F</td>
<td>144 g/L</td>
<td>&gt; 50g/L</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>14:04</td>
<td>25</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>13:46</td>
<td>25</td>
</tr>
<tr>
<td>Product G</td>
<td>0 g/L</td>
<td>≤ 50g/L</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>13:05</td>
<td>25</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>13:36</td>
<td>25</td>
</tr>
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<td>Product H</td>
<td>0 g/L</td>
<td>≤ 50g/L</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>8:47</td>
<td>25</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>8:58</td>
<td>25</td>
</tr>
<tr>
<td>Product I</td>
<td>150 g/L</td>
<td>&gt; 50g/L</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>13:46</td>
<td>25</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>10:12</td>
<td>25</td>
</tr>
<tr>
<td>Product J</td>
<td>112 g/L</td>
<td>&gt; 50g/L</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>9:15</td>
<td>25</td>
</tr>
<tr>
<td>Product</td>
<td>Replicate 1</td>
<td>9:43</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>------</td>
</tr>
<tr>
<td>Product K</td>
<td>Replicate 2</td>
<td>8:44</td>
</tr>
<tr>
<td>Product K</td>
<td>Replicate 3</td>
<td>8:49</td>
</tr>
</tbody>
</table>

| Product L | Replicate 2 | 9:33 | 25 | 28 | 10.5 | 1258177.49 | 0.36 | 431719.68 | 0.43 | 1.95 | 0.89 | 24.94 |
| Product L | Replicate 3 | 9:17 | 25 | 31.5 | 10.5 | 1258177.49 | 0.39 | 485684.64 | 0.49 | 1.74 | 0.90 | 28.31 |

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: \(y = -0.0661\ln(x) + 0.9351\)

1 gram = 81.6 chart divisions
1 gal = 0.003785411784 m^3
1 lb = 0.45359237 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: \(y = -0.0661\ln(x) + 0.9351\)

For this fit, \(R^2 = 0.9998\)
Phase II Report

November 23, 2005
## Executive Summary

### Products Listing by Category

<table>
<thead>
<tr>
<th>Group 4:</th>
<th>Published VOC</th>
<th>Grouping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product A2</td>
<td>142 g/L</td>
<td>&gt;100 g/L</td>
</tr>
<tr>
<td>Product B2</td>
<td>125 g/L</td>
<td>&gt;100 g/L</td>
</tr>
<tr>
<td>Product C2</td>
<td>63 g/L</td>
<td>≤100 g/L</td>
</tr>
<tr>
<td>Product D2</td>
<td>58 g/L</td>
<td>≤100 g/L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 5:</th>
<th>Waterproofing &amp; Concrete/Masonry Sealers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product E2</td>
<td>390 g/L</td>
</tr>
<tr>
<td>Product F2</td>
<td>350 g/L</td>
</tr>
<tr>
<td>Product G2</td>
<td>92 g/L</td>
</tr>
<tr>
<td>Product H2</td>
<td>86 g/L</td>
</tr>
<tr>
<td>Product I2</td>
<td>&lt; 65 g/L</td>
</tr>
<tr>
<td>Product J2</td>
<td>12 g/L</td>
</tr>
<tr>
<td>Product K2</td>
<td>270 g/L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 6:</th>
<th>Exterior Stains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product L2</td>
<td>250 g/L</td>
</tr>
<tr>
<td>Product M2</td>
<td>0 g/L</td>
</tr>
<tr>
<td>Product N2</td>
<td>0 g/L</td>
</tr>
<tr>
<td>Product O2</td>
<td>0 g/L</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Group 7:</th>
<th>Clear Wood Finishes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product P2</td>
<td>439 g/L</td>
</tr>
<tr>
<td>Product Q2</td>
<td>347 g/L</td>
</tr>
<tr>
<td>Product R2</td>
<td>250 g/L</td>
</tr>
<tr>
<td>Product S2</td>
<td>57 g/L</td>
</tr>
<tr>
<td>Product T2</td>
<td>50 g/L</td>
</tr>
<tr>
<td>Product U2</td>
<td>168 g/L</td>
</tr>
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</table>

### Number of Products Tested by Published VOC Range

<table>
<thead>
<tr>
<th>Category</th>
<th>Products &gt;100 g/L</th>
<th>Products ≤100 g/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primers/Sealers/Undercoaters</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Concrete/Masonry</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Exterior Stains</td>
<td>1</td>
<td>3</td>
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</table>

<table>
<thead>
<tr>
<th>Category</th>
<th>Products &gt;275 g/L</th>
<th>Products ≤275 g/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear Wood Finishes</td>
<td>2</td>
<td>4</td>
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## Tests for General Properties Summary

### Percent Nonvolatile Summary*

<table>
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<tr>
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<th>Grouping</th>
<th>Percent Nonvolatile</th>
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<tbody>
<tr>
<td><strong>Group 4:</strong> Primers, Sealers, and Undercoaters</td>
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<tr>
<td>Product A2</td>
<td>142 g/L</td>
<td>&gt;100 g/L</td>
<td>H</td>
</tr>
<tr>
<td>Product B2</td>
<td>125 g/L</td>
<td>&gt;100 g/L</td>
<td>H</td>
</tr>
<tr>
<td>Product C2</td>
<td>63 g/L</td>
<td>≤100 g/L</td>
<td>L</td>
</tr>
<tr>
<td>Product D2</td>
<td>58 g/L</td>
<td>≤100 g/L</td>
<td>L</td>
</tr>
<tr>
<td><strong>Group 5:</strong> Concrete/Masonry Sealers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product E2</td>
<td>390 g/L</td>
<td>&gt;100 g/L</td>
<td>H</td>
</tr>
<tr>
<td>Product F2</td>
<td>350 g/L</td>
<td>&gt;100 g/L</td>
<td>H</td>
</tr>
<tr>
<td>Product G2</td>
<td>92 g/L</td>
<td>≤100 g/L</td>
<td>L</td>
</tr>
<tr>
<td>Product H2</td>
<td>86 g/L</td>
<td>≤100 g/L</td>
<td>L</td>
</tr>
<tr>
<td>Product I2</td>
<td>&lt; 65 g/L</td>
<td>≤100 g/L</td>
<td>L</td>
</tr>
<tr>
<td>Product J2</td>
<td>12 g/L</td>
<td>≤100 g/L</td>
<td>L</td>
</tr>
<tr>
<td>Product K2</td>
<td>270 g/L</td>
<td>&gt; 100 g/L</td>
<td>H</td>
</tr>
<tr>
<td><strong>Group 6:</strong> Exterior Stains</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product L2</td>
<td>250 g/L</td>
<td>&gt;100 g/L</td>
<td>H</td>
</tr>
<tr>
<td>Product M2</td>
<td>0 g/L</td>
<td>≤100 g/L</td>
<td>L</td>
</tr>
<tr>
<td>Product N2</td>
<td>0 g/L</td>
<td>≤100 g/L</td>
<td>L</td>
</tr>
<tr>
<td>Product O2</td>
<td>0 g/L</td>
<td>≤100 g/L</td>
<td>L</td>
</tr>
<tr>
<td><strong>Group 7:</strong> Clear Wood Finishes</td>
<td></td>
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<td></td>
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<tr>
<td>Product P2</td>
<td>439 g/L</td>
<td>&gt;275 g/L</td>
<td>H</td>
</tr>
<tr>
<td>Product Q2</td>
<td>347 g/L</td>
<td>&gt;275 g/L</td>
<td>H</td>
</tr>
<tr>
<td>Product R2</td>
<td>250 g/L</td>
<td>≤275 g/L</td>
<td>L</td>
</tr>
<tr>
<td>Product S2</td>
<td>57 g/L</td>
<td>≤275 g/L</td>
<td>L</td>
</tr>
<tr>
<td>Product T2</td>
<td>50 g/L</td>
<td>≤275 g/L</td>
<td>L</td>
</tr>
<tr>
<td>Product U2</td>
<td>168 g/L</td>
<td>≤275 g/L</td>
<td>L</td>
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</table>

*Average Values
## Stability Summary

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

* 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

<table>
<thead>
<tr>
<th>Grouping</th>
<th>20°Mean</th>
<th>20 SD</th>
<th>60°Mean</th>
<th>60 SD</th>
<th>85°Mean</th>
<th>85 SD</th>
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<tr>
<td>Product A2</td>
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<td>9.1</td>
<td>0.2</td>
<td>11.0</td>
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<td>H</td>
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<td>0.1</td>
<td>18.6</td>
<td>0.4</td>
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<tr>
<td>Product C2</td>
<td>L</td>
<td>1.3</td>
<td>0.1</td>
<td>3.6</td>
<td>0.1</td>
<td>4.6</td>
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<tr>
<td>Product D2</td>
<td>L</td>
<td>2.2</td>
<td>0.1</td>
<td>10.4</td>
<td>0.2</td>
<td>10.2</td>
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<td>Group 5: Concrete/Masonry Sealers</td>
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<td></td>
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<td>H</td>
<td>2.6</td>
<td>0.2</td>
<td>20.2</td>
<td>0.8</td>
<td>54.5</td>
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<td>0.2</td>
<td>20.2</td>
<td>0.8</td>
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<td>0.2</td>
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<td>L</td>
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<td>0.1</td>
<td>7.3</td>
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<td>0.1</td>
<td>6.4</td>
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<td>L</td>
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<td>0.1</td>
<td>6.4</td>
<td>0.6</td>
<td>29.8</td>
</tr>
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<td>Group 6: Exterior Stains</td>
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<td>85.4</td>
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<td>40.7</td>
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<td>1.0</td>
<td>40.7</td>
<td>2.4</td>
<td>50.2</td>
</tr>
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<td>0.6</td>
<td>71.5</td>
<td>1.0</td>
<td>71.8</td>
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<td>45.5</td>
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</tr>
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<td>0.8</td>
<td>43.7</td>
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<td>84.7</td>
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<td>1.0</td>
<td>51.5</td>
<td>0.6</td>
<td>74.2</td>
</tr>
</tbody>
</table>

*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*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Stormer (KU)</th>
<th>Cone and Plate (P)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average</td>
<td>Temp. (°C)</td>
</tr>
<tr>
<td><strong>Group 4: Primers, Sealers, Undercoaters</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product A2</td>
<td>H</td>
<td>106</td>
</tr>
<tr>
<td>Product B2</td>
<td>H</td>
<td>117</td>
</tr>
<tr>
<td>Product C2</td>
<td>L</td>
<td>113</td>
</tr>
<tr>
<td>Product D2</td>
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<tr>
<td><strong>Group 5: Concrete/Masonry Sealers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product E2</td>
<td>H</td>
<td>127</td>
</tr>
<tr>
<td>Product F2</td>
<td>H</td>
<td>&lt; 53</td>
</tr>
<tr>
<td>Product G2</td>
<td>L</td>
<td>100</td>
</tr>
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<td>Product U2</td>
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*Spindle = 3 (Group 4), 2 (Product Q2), 1 (Group 5 and Group 7),

*Shear Rate = 12000 s^{-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
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*Average Values
Mechanical Dry Time Summary*

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*Average values; times in minutes; stylus diameter = 1mm; speed = 6 hours
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*Times are in minutes, and are the average of two samples*
### Gloss Summary*

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*Average values*
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<td>Product F2</td>
<td>H</td>
<td>N/A – Penetrating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product G2</td>
<td>L</td>
<td>0.94</td>
<td>0.96</td>
<td>0.92</td>
</tr>
<tr>
<td>Product H2</td>
<td>L</td>
<td>N/A – Penetrating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product I2</td>
<td>L</td>
<td>N/A – Penetrating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product J2</td>
<td>L</td>
<td>N/A – Penetrating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product K2</td>
<td>H</td>
<td>N/A – Penetrating</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Group 6:</strong> Exterior Stains</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product L2</td>
<td>H</td>
<td>N/A – Penetrating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product M2</td>
<td>L</td>
<td>N/A – Penetrating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product N2</td>
<td>L</td>
<td>N/A – Penetrating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product O2</td>
<td>L</td>
<td>N/A – Penetrating</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Group 7:</strong> Clear Wood Finishes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product P2</td>
<td>H</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product Q2</td>
<td>H</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product R2</td>
<td>L</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product S2</td>
<td>L</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product T2</td>
<td>L</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product U2</td>
<td>L</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Average values
### Tests for Primers, Sealers and Undercoaters Summary

#### Adhesion Direct to Wood – Battelle Torque Summary*

<table>
<thead>
<tr>
<th>Group 4: Primers, Sealers, and Undercoaters</th>
<th>Grouping</th>
<th>Adhesion (lb/in²)</th>
<th>Failure Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product A2</td>
<td>H</td>
<td>23.7</td>
<td>Primer - Cohesive</td>
</tr>
<tr>
<td>Product B2</td>
<td>H</td>
<td>16.8</td>
<td>Primer - Cohesive</td>
</tr>
<tr>
<td>Product C2</td>
<td>L</td>
<td>20.8</td>
<td>Primer – Cohesive**</td>
</tr>
<tr>
<td>Product D2</td>
<td>L</td>
<td>19.5</td>
<td>Primer - Cohesive</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Group 4: Primers, Sealers, and Undercoaters</th>
<th>Grouping</th>
<th>Rating</th>
<th>Failure Mechanism**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product A2</td>
<td>H</td>
<td>3.7</td>
<td>Substrate Failure/Primer Adhesion</td>
</tr>
<tr>
<td>Product B2</td>
<td>H</td>
<td>3.7</td>
<td>Substrate Failure/Primer Adhesion</td>
</tr>
<tr>
<td>Product C2</td>
<td>L</td>
<td>4</td>
<td>Substrate Failure/Primer Adhesion</td>
</tr>
<tr>
<td>Product D2</td>
<td>L</td>
<td>4</td>
<td>Substrate Failure/Primer Adhesion</td>
</tr>
</tbody>
</table>

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

#### Overcoat Adhesion – Battelle torque Summary

<table>
<thead>
<tr>
<th>Group 4: Primers, Sealers, and Undercoaters</th>
<th>Grouping</th>
<th>Adhesion (lb/in²)</th>
<th>Failure Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product A2</td>
<td>H</td>
<td>50.2</td>
<td>Substrate Failure**</td>
</tr>
<tr>
<td>Product B2</td>
<td>H</td>
<td>58.8</td>
<td>Substrate Failure</td>
</tr>
<tr>
<td>Product C2</td>
<td>L</td>
<td>50.0</td>
<td>Substrate Failure/Topcoat Adhesion***</td>
</tr>
<tr>
<td>Product D2</td>
<td>L</td>
<td>46.6</td>
<td>Topcoat Adhesion</td>
</tr>
</tbody>
</table>

*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*

<table>
<thead>
<tr>
<th>Group 4: Primers, Sealers, and Undercoaters</th>
<th>Grouping</th>
<th>Rating</th>
<th>Failure Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product A2</td>
<td>H</td>
<td>4</td>
<td>Topcoat Adhesion</td>
</tr>
<tr>
<td>Product B2</td>
<td>H</td>
<td>4</td>
<td>Topcoat Adhesion/Primer Adhesion**</td>
</tr>
<tr>
<td>Product C2</td>
<td>L</td>
<td>3.3</td>
<td>Primer Adhesion***</td>
</tr>
<tr>
<td>Product D2</td>
<td>L</td>
<td>3.3</td>
<td>Topcoat Adhesion****</td>
</tr>
</tbody>
</table>

*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*

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

*Average values

### Tannin Stain Resistance, Color Change (ΔE) Summary*

<table>
<thead>
<tr>
<th>Group 4: Primers, Sealers, and Undercoaters</th>
<th>Grouping</th>
<th>Pine</th>
<th>Cedar</th>
<th>Oak</th>
<th>Redwood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product A2</td>
<td>H</td>
<td>1.93</td>
<td>3.64</td>
<td>4.89</td>
<td>6.98</td>
</tr>
<tr>
<td>Product B2</td>
<td>H</td>
<td>2.25</td>
<td>2.62</td>
<td>2.77</td>
<td>4.95</td>
</tr>
<tr>
<td>Product C2</td>
<td>L</td>
<td>3.99</td>
<td>4.03</td>
<td>4.44</td>
<td>6.08</td>
</tr>
<tr>
<td>Product D2</td>
<td>L</td>
<td>1.70</td>
<td>3.37</td>
<td>5.32</td>
<td>8.42</td>
</tr>
</tbody>
</table>

*Average Values

### Grain Raising & Sandability Summary*

<table>
<thead>
<tr>
<th>Group 4: Primers, Sealers, and Undercoaters</th>
<th>Grouping</th>
<th>Grain Raising</th>
<th>Sandability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oak</td>
<td>Pine</td>
<td>Oak</td>
</tr>
<tr>
<td>Product A2</td>
<td>H</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Product B2</td>
<td>H</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Product C2</td>
<td>L</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Product D2</td>
<td>L</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

*Average Values

### Enamel Holdout Summary*

<table>
<thead>
<tr>
<th>Group 4: Primers, Sealers, and Undercoaters</th>
<th>Group</th>
<th>20° Mean</th>
<th>20° SD</th>
<th>60° Mean</th>
<th>60° SD</th>
<th>85° Mean</th>
<th>85° SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product A2</td>
<td>H</td>
<td>12.9</td>
<td>0.7</td>
<td>51.9</td>
<td>1.0</td>
<td>53.7</td>
<td>0.7</td>
</tr>
<tr>
<td>Product B2</td>
<td>H</td>
<td>8.6</td>
<td>0.4</td>
<td>38.2</td>
<td>1.0</td>
<td>40.9</td>
<td>0.9</td>
</tr>
<tr>
<td>Product C2</td>
<td>L</td>
<td>7.7</td>
<td>0.4</td>
<td>37.7</td>
<td>1.3</td>
<td>42.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Product D2</td>
<td>L</td>
<td>10.8</td>
<td>0.7</td>
<td>47.2</td>
<td>1.1</td>
<td>51.2</td>
<td>1.1</td>
</tr>
<tr>
<td>Standard</td>
<td></td>
<td>71.3</td>
<td>0.7</td>
<td>85.9</td>
<td>0.4</td>
<td>97.1</td>
<td>0.8</td>
</tr>
</tbody>
</table>

*Average Values

### Flow/Level and Sag Summary*

<table>
<thead>
<tr>
<th>Group 4: Primers, Sealers and Undercoaters</th>
<th>Grouping</th>
<th>Flow/Level</th>
<th>Sag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product A2</td>
<td>H</td>
<td>1</td>
<td>12+</td>
</tr>
<tr>
<td>Product B2</td>
<td>H</td>
<td>0</td>
<td>12+</td>
</tr>
<tr>
<td>Product C2</td>
<td>L</td>
<td>0</td>
<td>12+</td>
</tr>
<tr>
<td>Product D2</td>
<td>L</td>
<td>0</td>
<td>12+</td>
</tr>
</tbody>
</table>

*Average values
## Tests for Waterproofing Concrete/Masonry Sealers Summary

### Alkali, Acid, & Stain Resistance Visual Evaluation Summary

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

*Averages of visual inspections
**’ppt’ means that a precipitate was formed on the surface
### Alkali, Acid & Stain Resistance, Wine Spectrophotometer Evaluation Summary

<table>
<thead>
<tr>
<th>Group 5:</th>
<th>Concrete/Masonry Sealers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product E2</td>
<td>71.38/51.97</td>
</tr>
<tr>
<td>Product F2</td>
<td>42.75/33.52</td>
</tr>
<tr>
<td>Product G2</td>
<td>84.51/59.64</td>
</tr>
<tr>
<td>Product H2</td>
<td>38.04/28.36</td>
</tr>
<tr>
<td>Product I2</td>
<td>39.95/30.09</td>
</tr>
<tr>
<td>Product J2</td>
<td>41.84/23.13</td>
</tr>
<tr>
<td>Product K2</td>
<td>44.12/35.21</td>
</tr>
</tbody>
</table>

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

### Prohesion, Color Change (ΔE) Summary

<table>
<thead>
<tr>
<th>Group 5:</th>
<th>Concrete/Masonry Sealers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product E2</td>
<td>H</td>
</tr>
<tr>
<td>Product F2</td>
<td>H</td>
</tr>
<tr>
<td>Product G2</td>
<td>L</td>
</tr>
<tr>
<td>Product H2</td>
<td>L</td>
</tr>
<tr>
<td>Product I2</td>
<td>L</td>
</tr>
<tr>
<td>Product J2</td>
<td>L</td>
</tr>
<tr>
<td>Product K2</td>
<td>H</td>
</tr>
</tbody>
</table>

*Average Values

### Chloride/Nitrate Ion Screening Summary

<table>
<thead>
<tr>
<th>Group 5:</th>
<th>Concrete/Masonry Sealers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product E2</td>
<td>H</td>
</tr>
<tr>
<td>Product F2</td>
<td>H</td>
</tr>
<tr>
<td>Product G2</td>
<td>L</td>
</tr>
<tr>
<td>Product H2</td>
<td>L</td>
</tr>
<tr>
<td>Product I2</td>
<td>L</td>
</tr>
<tr>
<td>Product J2</td>
<td>L</td>
</tr>
<tr>
<td>Product K2</td>
<td>H</td>
</tr>
</tbody>
</table>

*Average Values

### Efflorescence Summary

<table>
<thead>
<tr>
<th>Group 5:</th>
<th>Concrete/Masonry Sealers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product E2</td>
<td>H</td>
</tr>
<tr>
<td>Product F2</td>
<td>H</td>
</tr>
<tr>
<td>Product G2</td>
<td>L</td>
</tr>
<tr>
<td>Product H2</td>
<td>L</td>
</tr>
<tr>
<td>Product I2</td>
<td>L</td>
</tr>
<tr>
<td>Product J2</td>
<td>L</td>
</tr>
<tr>
<td>Product K2</td>
<td>H</td>
</tr>
</tbody>
</table>

*Average Values
### Water Vapor Transmission*

<table>
<thead>
<tr>
<th>Grouping</th>
<th><strong>Average Slope</strong></th>
<th><em><strong>$R^2$ – 1</strong></em></th>
<th><em><strong>$R^2$ – 2</strong></em></th>
<th><em><strong>$R^2$ – 3</strong></em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Product E2</td>
<td>H</td>
<td>-0.01043</td>
<td>0.9883</td>
<td>0.987</td>
</tr>
<tr>
<td>Product F2</td>
<td>H</td>
<td>-0.04657</td>
<td>0.9986</td>
<td>1</td>
</tr>
<tr>
<td>Product G2</td>
<td>L</td>
<td>-0.03493</td>
<td>1</td>
<td>0.9877</td>
</tr>
<tr>
<td>Product H2</td>
<td>L</td>
<td>-0.0408</td>
<td>0.9999</td>
<td>0.9982</td>
</tr>
<tr>
<td>Product I2</td>
<td>L</td>
<td>-0.04757</td>
<td>0.9973</td>
<td>0.9999</td>
</tr>
<tr>
<td>Product J2</td>
<td>L</td>
<td>-0.06157</td>
<td>0.9998</td>
<td>0.9967</td>
</tr>
<tr>
<td>Product K2</td>
<td>H</td>
<td>-0.0568</td>
<td>0.9995</td>
<td>0.9998</td>
</tr>
<tr>
<td>Standard</td>
<td>------</td>
<td>-0.05117</td>
<td>0.9931</td>
<td>0.9988</td>
</tr>
</tbody>
</table>

*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 $R^2$ value of 1 is considered to be a perfect correlation, an $R^2$ value of 0.99 or greater is an excellent 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*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Ketchup</th>
<th>Mustard</th>
<th>Wine</th>
<th>Carbon Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product L2</td>
<td>H 1.71</td>
<td>1.88</td>
<td>1.58</td>
<td>16.75</td>
</tr>
<tr>
<td>Product M2</td>
<td>L 0.99</td>
<td>1.12</td>
<td>0.99</td>
<td>33.92</td>
</tr>
<tr>
<td>Product N2</td>
<td>L 0.39</td>
<td>1.06</td>
<td>0.98</td>
<td>24.62</td>
</tr>
<tr>
<td>Product O2</td>
<td>L 0.54</td>
<td>3.12</td>
<td>0.82</td>
<td>25.63</td>
</tr>
</tbody>
</table>

*Average Values

## Direct Adhesion on Wood (ASTM D3359) Summary*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Rating</th>
<th>Failure Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product L2</td>
<td>H N/A - Solvent</td>
<td>N/A - Solvent</td>
</tr>
<tr>
<td>Product M2</td>
<td>L 4</td>
<td>Substrate Failure</td>
</tr>
<tr>
<td>Product N2</td>
<td>L 3</td>
<td>Substrate Failure/Stain Adhesion**</td>
</tr>
<tr>
<td>Product O2</td>
<td>L 3.7</td>
<td>Substrate Failure/Stain Adhesion**</td>
</tr>
</tbody>
</table>

*Average Values

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

## Taber Abrasion Summary*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>I (Wear Index)</th>
<th>L (Weight Loss, mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product L2</td>
<td>H 94.42</td>
<td>37.77</td>
</tr>
<tr>
<td>Product M2</td>
<td>L 194.25</td>
<td>77.70</td>
</tr>
<tr>
<td>Product N2</td>
<td>L 136.92</td>
<td>54.77</td>
</tr>
<tr>
<td>Product O2</td>
<td>L 33.33</td>
<td>13.33</td>
</tr>
</tbody>
</table>

*Average Values

## QUV Summary – Color Change*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>ΔE, 200 Hours</th>
<th>ΔE, 400 Hours</th>
<th>ΔE, 600 Hours</th>
<th>ΔE, 800 Hours</th>
<th>ΔE, 1000 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product L2</td>
<td>H 22.82</td>
<td>22.92</td>
<td>22.24</td>
<td>21.36</td>
<td>20.61</td>
</tr>
<tr>
<td>Product N2</td>
<td>L 8.71</td>
<td>10.43</td>
<td>13.58</td>
<td>15.62</td>
<td>18.50</td>
</tr>
<tr>
<td>Product O2</td>
<td>L 26.63</td>
<td>26.40</td>
<td>26.74</td>
<td>24.65</td>
<td>22.41</td>
</tr>
</tbody>
</table>

*Average values

## QUV Summary – Gloss: 0 Hours / 1000 Hours*

<table>
<thead>
<tr>
<th>Group</th>
<th>20° Mean</th>
<th>20° SD</th>
<th>60° Mean</th>
<th>60° SD</th>
<th>85° Mean</th>
<th>85° SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product L2</td>
<td>H 0.8/0.5</td>
<td>0.1/0.1</td>
<td>2.5/1.8</td>
<td>0.2/0.1</td>
<td>1.1/1.3</td>
<td>0.2/0.1</td>
</tr>
<tr>
<td>Product M2</td>
<td>L 0.8/0.5</td>
<td>0.1/0.1</td>
<td>2.2/2.5</td>
<td>0.2/0.2</td>
<td>0.7/1.5</td>
<td>0.1/0.1</td>
</tr>
<tr>
<td>Product N2</td>
<td>L 0.8/0.4</td>
<td>0.1/0.1</td>
<td>2.4/1.8</td>
<td>0.2/0.1</td>
<td>0.6/1.0</td>
<td>0.2/0.1</td>
</tr>
<tr>
<td>Product O2</td>
<td>L 1.5/0.8</td>
<td>0.2/0.1</td>
<td>9.7/5.1</td>
<td>1.5/0.5</td>
<td>5.2/4.2</td>
<td>1.0/0.4</td>
</tr>
</tbody>
</table>

*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*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Friction Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear Wood Finishes</td>
<td></td>
</tr>
<tr>
<td>Product P2</td>
<td>H</td>
</tr>
<tr>
<td>Product Q2</td>
<td>H</td>
</tr>
<tr>
<td>Product R2</td>
<td>L</td>
</tr>
<tr>
<td>Product S2</td>
<td>L</td>
</tr>
<tr>
<td>Product T2</td>
<td>L</td>
</tr>
<tr>
<td>Product U2</td>
<td>L</td>
</tr>
</tbody>
</table>

*Average Values

## Stain Resistance Summary*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Water, Visual</th>
<th>Vodka, Visual</th>
<th>Wine, ΔE</th>
<th>Carbon Black, ΔE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear Wood Finishes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product P2</td>
<td>None</td>
<td>None</td>
<td>1.76</td>
<td>1.57</td>
</tr>
<tr>
<td>Product Q2</td>
<td>None</td>
<td>None</td>
<td>2.20</td>
<td>14.62</td>
</tr>
<tr>
<td>Product R2</td>
<td>None</td>
<td>Slight Ring</td>
<td>0.60</td>
<td>0.81</td>
</tr>
<tr>
<td>Product S2</td>
<td>None</td>
<td>None</td>
<td>0.89</td>
<td>6.08</td>
</tr>
<tr>
<td>Product T2</td>
<td>None</td>
<td>Slight Ring</td>
<td>1.31</td>
<td>2.48</td>
</tr>
<tr>
<td>Product U2</td>
<td>None</td>
<td>Stain-Gloss Change</td>
<td>0.34</td>
<td>4.16</td>
</tr>
</tbody>
</table>

*Average Values

## Mar Resistance*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Percent Gloss Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear Wood Finishes</td>
<td></td>
</tr>
<tr>
<td>Product P2</td>
<td>H</td>
</tr>
<tr>
<td>Product Q2</td>
<td>H</td>
</tr>
<tr>
<td>Product R2</td>
<td>L</td>
</tr>
<tr>
<td>Product S2</td>
<td>L</td>
</tr>
<tr>
<td>Product T2</td>
<td>L</td>
</tr>
<tr>
<td>Product U2</td>
<td>L</td>
</tr>
</tbody>
</table>

*Average Values

## Taber Abrasion Summary*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>I (Wear Index)</th>
<th>L (Weight Loss, mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear Wood Finishes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product P2</td>
<td>H</td>
<td>50.50</td>
</tr>
<tr>
<td>Product Q2</td>
<td>H</td>
<td>66.75</td>
</tr>
<tr>
<td>Product R2</td>
<td>L</td>
<td>36.83</td>
</tr>
<tr>
<td>Product S2</td>
<td>L</td>
<td>20.92</td>
</tr>
<tr>
<td>Product T2</td>
<td>L</td>
<td>77.33</td>
</tr>
<tr>
<td>Product U2</td>
<td>L</td>
<td>65.75</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Group</th>
<th>20° Mean</th>
<th>20 SD</th>
<th>60° Mean</th>
<th>60 SD</th>
<th>85° Mean</th>
<th>85 SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 7: Clear Wood Finishes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product P2</td>
<td>H</td>
<td>44.6/5.0</td>
<td>1.2/0.9</td>
<td>85.1/9.6</td>
<td>1.5/2.4</td>
<td>86.9/27.7</td>
</tr>
<tr>
<td>Product Q2</td>
<td>H</td>
<td>125.8/113.3</td>
<td>1.1/3.0</td>
<td>125.5/123.7</td>
<td>1.3/1.4</td>
<td>97.4/92.7</td>
</tr>
<tr>
<td>Product R2</td>
<td>L</td>
<td>25.9/11.4</td>
<td>1.0/0.2</td>
<td>51.4/3.5</td>
<td>1.0/0.7</td>
<td>46.1/4.0</td>
</tr>
<tr>
<td>Product S2</td>
<td>L</td>
<td>30.5/15.1</td>
<td>1.3/1.3</td>
<td>59.5/33.7</td>
<td>1.7/1.7</td>
<td>62.9/38.2</td>
</tr>
<tr>
<td>Product T2</td>
<td>L</td>
<td>108.0/24.1</td>
<td>6.3/2.5</td>
<td>120.7/50.4</td>
<td>1.4/4.6</td>
<td>92.0/67.5</td>
</tr>
<tr>
<td>Product U2</td>
<td>L</td>
<td>46.7/2.1</td>
<td>2.1/0.3</td>
<td>77.0/4.2</td>
<td>1.8/0.5</td>
<td>76.3/3.5</td>
</tr>
</tbody>
</table>

*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*

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

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

QUV Summary – Aluminum, Color Change*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>ΔE, 200 Hours</th>
<th>ΔE, 400 Hours</th>
<th>ΔE, 600 Hours</th>
<th>ΔE, 800 Hours</th>
<th>ΔE, 1000 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 7: Clear Wood Finishes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product P2</td>
<td>H</td>
<td>11.09</td>
<td>15.08</td>
<td>18.21</td>
<td>19.12</td>
</tr>
<tr>
<td>Product Q2</td>
<td>H</td>
<td>5.22</td>
<td>5.16</td>
<td>5.88</td>
<td>6.48</td>
</tr>
<tr>
<td>Product R2</td>
<td>L</td>
<td>4.68</td>
<td>4.77</td>
<td>5.29</td>
<td>10.54</td>
</tr>
<tr>
<td>Product S2</td>
<td>L</td>
<td>1.90</td>
<td>2.21</td>
<td>3.17</td>
<td>3.48</td>
</tr>
<tr>
<td>Product T2</td>
<td>L</td>
<td>0.33</td>
<td>1.99</td>
<td>3.36</td>
<td>9.39</td>
</tr>
<tr>
<td>Product U2</td>
<td>L</td>
<td>1.29</td>
<td>3.38</td>
<td>5.14</td>
<td>10.22</td>
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</table>

*Average values

QUV Summary – Pine, Color Change*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>ΔE, 200 Hours</th>
<th>ΔE, 400 Hours</th>
<th>ΔE, 600 Hours</th>
<th>ΔE, 800 Hours</th>
<th>ΔE, 1000 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 7: Clear Wood Finishes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product P2</td>
<td>H</td>
<td>20.30</td>
<td>26.38</td>
<td>30.16</td>
<td>29.70</td>
</tr>
<tr>
<td>Product Q2</td>
<td>H</td>
<td>8.66</td>
<td>12.91</td>
<td>15.96</td>
<td>17.78</td>
</tr>
<tr>
<td>Product R2</td>
<td>L</td>
<td>20.77</td>
<td>24.43</td>
<td>27.49</td>
<td>23.53</td>
</tr>
<tr>
<td>Product S2</td>
<td>L</td>
<td>19.89</td>
<td>23.95</td>
<td>26.50</td>
<td>27.27</td>
</tr>
<tr>
<td>Product T2</td>
<td>L</td>
<td>23.30</td>
<td>28.06</td>
<td>29.78</td>
<td>31.40</td>
</tr>
<tr>
<td>Product U2</td>
<td>L</td>
<td>23.77</td>
<td>28.41</td>
<td>30.28</td>
<td>32.06</td>
</tr>
</tbody>
</table>

*Average values
Flow/Level and Sag Summary*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Flow/Level</th>
<th>Sag</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 7: Clear Wood Finishes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product P2</td>
<td>H</td>
<td>10</td>
</tr>
<tr>
<td>Product Q2</td>
<td>H</td>
<td>10</td>
</tr>
<tr>
<td>Product R2</td>
<td>L</td>
<td>8.3</td>
</tr>
<tr>
<td>Product S2</td>
<td>L</td>
<td>9</td>
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<tr>
<td>Product T2</td>
<td>L</td>
<td>10</td>
</tr>
<tr>
<td>Product U2</td>
<td>L</td>
<td>10</td>
</tr>
</tbody>
</table>

*Average values
### Task 1 - Testing Protocol

#### Tests for General Properties of all paints

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

#### Tests for Primers, Sealers, and Undercoaters

<table>
<thead>
<tr>
<th>Property</th>
<th>Standard</th>
<th>Number of Replicates</th>
<th>Substrate</th>
<th>Film Thickness/ Bar Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhesion Direct to Wood</td>
<td>Battelle Torque &amp; ASTM D3359</td>
<td>3</td>
<td>Pine</td>
<td>Coated by weight</td>
</tr>
<tr>
<td>Overcoat Adhesion</td>
<td>Battelle Torque &amp; ASTM D3359</td>
<td>3</td>
<td>Pine</td>
<td>Coated by weight</td>
</tr>
<tr>
<td>Stain Bleed Resistance</td>
<td>Our Protocol</td>
<td>3 (of each stain)</td>
<td>Drywall</td>
<td>3 mil/Bird bar</td>
</tr>
<tr>
<td>Tannin Stain Resistance</td>
<td>ASTM D6686-01</td>
<td>3</td>
<td>Pine, Cedar, Oak, Redwood</td>
<td>Coated by weight</td>
</tr>
<tr>
<td>Grain Raising</td>
<td>Our Protocol</td>
<td>2</td>
<td>Pine and Oak</td>
<td>Coated by weight</td>
</tr>
<tr>
<td>Sandability</td>
<td>150 grit visual rating</td>
<td>2</td>
<td>Pine and Oak</td>
<td>Coated by weight</td>
</tr>
<tr>
<td>Enamel Holdout</td>
<td>Our Protocol</td>
<td>3</td>
<td>Drywall</td>
<td>3mil/Bird bar</td>
</tr>
<tr>
<td>Flow &amp; Leveling</td>
<td>ASTM D4062</td>
<td>3</td>
<td>Leneta Card 1-B</td>
<td>NPCA Bar</td>
</tr>
<tr>
<td>Sag Resistance</td>
<td>ASTM D4400-99</td>
<td>3</td>
<td>Leneta Card 1-B</td>
<td>Anti-Sag Meter</td>
</tr>
</tbody>
</table>
## Tests for Waterproofing Concrete/Masonry Sealers

<table>
<thead>
<tr>
<th>Property</th>
<th>Standard</th>
<th>Number of Replicates</th>
<th>Substrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkali, Acid &amp; Stain Resistance</td>
<td>ASTM D1308</td>
<td>3</td>
<td>Concrete</td>
</tr>
<tr>
<td>Prohesion</td>
<td>ASTM G85 Annex A5</td>
<td>2</td>
<td>Concrete</td>
</tr>
<tr>
<td>Chloride Ion Screening</td>
<td>CHLOR*TEST</td>
<td>2</td>
<td>Concrete</td>
</tr>
<tr>
<td>Efflorescence</td>
<td>ASTM D7072-04</td>
<td>3</td>
<td>Concrete</td>
</tr>
<tr>
<td>Water Vapor Transmission</td>
<td>ASTM D1653</td>
<td>3</td>
<td>Leneta</td>
</tr>
</tbody>
</table>

## Tests for Exterior Stains

<table>
<thead>
<tr>
<th>Property</th>
<th>Standard</th>
<th>Number of Replicates</th>
<th>Substrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stain Resistance</td>
<td>ASTM D4828 (modified)</td>
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<td>Pine</td>
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</tr>
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<td>ASTM D4060</td>
<td>3</td>
<td>Birch</td>
</tr>
<tr>
<td>QUV</td>
<td>ASTM D4587</td>
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<td>Pine</td>
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## Tests for Clear Wood Finishes

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<th>Standard</th>
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<td>Mar Resistance</td>
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<td>ASTM D4587</td>
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<td>Aluminum, Pine</td>
<td>Wirewound, 3 coats by brush</td>
</tr>
<tr>
<td>Flow &amp; Leveling</td>
<td>ASTM D4062</td>
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<td>Leneta Card 1-B</td>
<td>NPCA Bar</td>
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<td>Sag Resistance</td>
<td>ASTM D4400-99</td>
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<td>Leneta Card 1-B</td>
<td>Anti-Sag Meter</td>
</tr>
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</table>
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 analogous 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 analogous 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

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<tr>
<th>Codes</th>
<th>Published VOC</th>
<th>Grouping</th>
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<td></td>
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<tr>
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<td>&gt; 100g/L</td>
</tr>
<tr>
<td>RP1 (t)</td>
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## Products Listing by Category

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## Number of Products Tested by Published VOC Range

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**Tests for General Properties Summary**

**Percent Nonvolatile Summary**

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*Average Values

**Stormer and Cone and Plate Viscosities Summary**

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*Average Values

**Note:**
- RP4 (t) cone and plate values are the same as RP4 (p).
- RP4 (t) cone and plate values are the same as RP4 (p).
- RP3 (t) cone and plate values are the same as RP3 (p).
### Group 9: Industrial Maintenance

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<td>117</td>
<td>25</td>
<td>17.183</td>
</tr>
<tr>
<td>IM3 (p)</td>
<td>L</td>
<td>122</td>
<td>25</td>
<td>N/A***</td>
</tr>
<tr>
<td>IM3 (i)</td>
<td>L</td>
<td>108</td>
<td>25</td>
<td>20.5165</td>
</tr>
<tr>
<td>IM3 (t)</td>
<td>L</td>
<td>120</td>
<td>25</td>
<td>1.851</td>
</tr>
<tr>
<td>IM4 (p)</td>
<td>L</td>
<td>74</td>
<td>25</td>
<td>N/A***</td>
</tr>
<tr>
<td>IM4 (i)</td>
<td>L</td>
<td>107</td>
<td>25</td>
<td>23.550</td>
</tr>
<tr>
<td>IM4 (t)</td>
<td>L</td>
<td>98</td>
<td>25</td>
<td>0.664</td>
</tr>
</tbody>
</table>

*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

<table>
<thead>
<tr>
<th>Group</th>
<th>Set-Touch</th>
<th>Tack-Free</th>
<th>Dry-Hard</th>
<th>Dry-Through</th>
</tr>
</thead>
<tbody>
<tr>
<td>RP1 (p)</td>
<td>H</td>
<td>2</td>
<td>208</td>
<td>277</td>
</tr>
<tr>
<td>RP1 (t)</td>
<td>H</td>
<td>15</td>
<td>163</td>
<td>231</td>
</tr>
<tr>
<td>RP2 (p)</td>
<td>H</td>
<td>29</td>
<td>105</td>
<td>157</td>
</tr>
<tr>
<td>RP2 (t)</td>
<td>H</td>
<td>46</td>
<td>179</td>
<td>213</td>
</tr>
<tr>
<td>RP3 (p)</td>
<td>L</td>
<td>5</td>
<td>8</td>
<td>N/A**</td>
</tr>
<tr>
<td>RP3 (t)</td>
<td>L</td>
<td>6</td>
<td>9</td>
<td>N/A**</td>
</tr>
<tr>
<td>RP4 (p)</td>
<td>L</td>
<td>9</td>
<td>17</td>
<td>22</td>
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<tr>
<td>RP4 (t)</td>
<td>L</td>
<td>Same as RP4 (p)</td>
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### Ambient Dry Time Summary

<table>
<thead>
<tr>
<th>Group</th>
<th>Set-Touch</th>
<th>Dust-Free</th>
<th>Tack-Free</th>
<th>Dry-Hard</th>
<th>Dry-Through</th>
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</thead>
<tbody>
<tr>
<td>RP1 (p)</td>
<td>H</td>
<td>59</td>
<td>85</td>
<td>193</td>
<td>892</td>
</tr>
<tr>
<td>RP1 (t)</td>
<td>H</td>
<td>169</td>
<td>990</td>
<td>1075</td>
<td>1152</td>
</tr>
</tbody>
</table>

*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.
<table>
<thead>
<tr>
<th>Group 9: Industrial Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>RP2 (p)</td>
</tr>
<tr>
<td>RP2 (t)</td>
</tr>
<tr>
<td>RP3 (p)</td>
</tr>
<tr>
<td>RP3 (t)</td>
</tr>
<tr>
<td>RP4 (p)</td>
</tr>
<tr>
<td>RP4 (t)</td>
</tr>
<tr>
<td>IM2 (p)</td>
</tr>
<tr>
<td>IM2 (i)</td>
</tr>
<tr>
<td>IM2 (t)</td>
</tr>
<tr>
<td>IM3 (p)</td>
</tr>
<tr>
<td>IM3 (i)</td>
</tr>
<tr>
<td>IM3 (t)</td>
</tr>
<tr>
<td>IM4 (p)</td>
</tr>
<tr>
<td>IM4 (i)</td>
</tr>
<tr>
<td>IM4 (t)</td>
</tr>
</tbody>
</table>

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

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

*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

<table>
<thead>
<tr>
<th>Grouping</th>
<th>3 mil #1</th>
<th>3 mil #2</th>
<th>2 mil #1</th>
<th>2 mil #2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 8:</strong> Rust Preventative</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RP1 (p)</td>
<td>H</td>
<td>0.97</td>
<td>0.97</td>
<td>0.95</td>
</tr>
<tr>
<td>RP1 (t)</td>
<td>H</td>
<td>0.98</td>
<td>0.97</td>
<td>0.97</td>
</tr>
<tr>
<td>RP2 (p)</td>
<td>H</td>
<td>0.96</td>
<td>0.96</td>
<td>0.93</td>
</tr>
<tr>
<td>RP2 (t)</td>
<td>H</td>
<td>0.97</td>
<td>0.97</td>
<td>0.95</td>
</tr>
<tr>
<td>RP3 (p)</td>
<td>L</td>
<td>0.97</td>
<td>0.97</td>
<td>0.95</td>
</tr>
<tr>
<td>RP3 (t)</td>
<td>L</td>
<td>N/A – Clear Coating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RP4 (p)</td>
<td>L</td>
<td>0.99</td>
<td>0.99</td>
<td>0.97</td>
</tr>
<tr>
<td>RP4 (t)</td>
<td>L</td>
<td>Same as RP4 (p)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Group 9:</strong> Industrial Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IM2 (p)</td>
<td>H</td>
<td>1.06</td>
<td>0.99</td>
<td>1.05</td>
</tr>
<tr>
<td>IM2 (i)</td>
<td>H</td>
<td>0.05</td>
<td>0.05</td>
<td>0.04</td>
</tr>
<tr>
<td>IM2 (t)</td>
<td>H</td>
<td>0.99</td>
<td>0.99</td>
<td>0.99</td>
</tr>
<tr>
<td>IM3 (p)</td>
<td>L</td>
<td>N/A – No Adhesion to Sealed Portion of Chart</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IM3 (i)</td>
<td>L</td>
<td>1.00</td>
<td>1.00</td>
<td>0.99</td>
</tr>
<tr>
<td>IM3 (t)</td>
<td>L</td>
<td>0.99</td>
<td>0.99</td>
<td>0.98</td>
</tr>
<tr>
<td>IM4 (p)</td>
<td>L</td>
<td>0.98</td>
<td>0.99</td>
<td>0.99</td>
</tr>
<tr>
<td>IM4 (i)</td>
<td>L</td>
<td>0.93</td>
<td>0.94</td>
<td>0.87</td>
</tr>
<tr>
<td>IM4 (t)</td>
<td>L</td>
<td>0.97</td>
<td>0.97</td>
<td>0.95</td>
</tr>
<tr>
<td>--------</td>
<td>----</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
</tbody>
</table>

*Average values*
### Tests for Rust Preventative Coatings Summary

#### Taber Abrasion Summary*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>I, Wear Index</th>
<th>L, Weight Loss, mg</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 8:</strong> Rust Preventative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RP1 (p/t)</td>
<td>H 87.92</td>
<td>35.17</td>
</tr>
<tr>
<td>RP2 (p/t)</td>
<td>H 74.67</td>
<td>29.87</td>
</tr>
<tr>
<td>RP3 (p/t)</td>
<td>L 36.75</td>
<td>14.70</td>
</tr>
<tr>
<td>RP4 (p/t)</td>
<td>L 64.17</td>
<td>25.67</td>
</tr>
</tbody>
</table>

*Average Values

#### Impact Resistance Summary*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Last Pass</th>
<th>First Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 8:</strong> Rust Preventative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RP1 (p/t)</td>
<td>H 40</td>
<td>50</td>
</tr>
<tr>
<td>RP2 (p/t)</td>
<td>H 97</td>
<td>107</td>
</tr>
<tr>
<td>RP3 (p/t)</td>
<td>L 100</td>
<td>110</td>
</tr>
<tr>
<td>RP4 (p/t)</td>
<td>L 40</td>
<td>50</td>
</tr>
</tbody>
</table>

*Average Values

#### Adhesion on Steel Summary*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>PATTI</th>
<th>Battelle</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 8:</strong> Rust Preventative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RP1 (p/t)</td>
<td>H 1121.0</td>
<td>Co-90%, Ad – 10%</td>
</tr>
<tr>
<td>RP2 (p/t)</td>
<td>H 746.8</td>
<td>Co-77%, Ad – 23%</td>
</tr>
<tr>
<td>RP3 (p/t)</td>
<td>L 733.2</td>
<td>Co-32%, Ad-68%</td>
</tr>
<tr>
<td>RP4 (p/t)</td>
<td>L 661.8</td>
<td>Co-23%, Ad-77%</td>
</tr>
</tbody>
</table>

*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*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Published VOC</th>
<th>Grouping</th>
<th>Flow/Level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 8:</strong> Rust Preventatives</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RP1 (p)</td>
<td>345 g/L</td>
<td>&gt; 100g/L</td>
<td>H 1</td>
</tr>
<tr>
<td>RP1 (t)</td>
<td>390 g/L</td>
<td>&gt; 100g/L</td>
<td>H 5</td>
</tr>
<tr>
<td>RP2 (p)</td>
<td>340 g/L</td>
<td>&gt; 100g/L</td>
<td>H 5</td>
</tr>
<tr>
<td>RP2 (t)</td>
<td>370 g/L</td>
<td>&gt; 100g/L</td>
<td>H 9</td>
</tr>
<tr>
<td>RP3 (p)</td>
<td>58 g/L</td>
<td>≤ 100g/L</td>
<td>L 5</td>
</tr>
<tr>
<td>RP3 (t)</td>
<td>&lt;50 g/L</td>
<td>≤ 100g/L</td>
<td>L 4</td>
</tr>
<tr>
<td>RP4 (p)</td>
<td>0 g/L</td>
<td>≤ 100g/L</td>
<td>L 1</td>
</tr>
</tbody>
</table>
RP4 (t) 0 g/L \( \leq 100 \text{g/L} \) L Same as RP4 (p)

*Average Values

**Prohesion – Gloss – 0 Cycles Summary**

<table>
<thead>
<tr>
<th>Grouping</th>
<th>20° Mean</th>
<th>20° SD</th>
<th>60° Mean</th>
<th>60° SD</th>
<th>85° Mean</th>
<th>85° SD</th>
</tr>
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<tbody>
<tr>
<td>RP1 (p/t) H</td>
<td>33.3</td>
<td>5.6</td>
<td>75.7</td>
<td>5.7</td>
<td>70.6</td>
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</tr>
<tr>
<td>RP2 (p/t) H</td>
<td>48.0</td>
<td>3.9</td>
<td>82.1</td>
<td>1.7</td>
<td>83.5</td>
<td>1.9</td>
</tr>
<tr>
<td>RP3 (p/t) L</td>
<td>21.3</td>
<td>1.7</td>
<td>63.2</td>
<td>1.4</td>
<td>66.8</td>
<td>1.3</td>
</tr>
<tr>
<td>RP4 (p/t) L</td>
<td>9.5</td>
<td>1.0</td>
<td>40.9</td>
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<td>56.2</td>
<td>3.8</td>
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</tbody>
</table>

*Average Values

**Prohesion – Gloss – 1 Cycle Summary**

<table>
<thead>
<tr>
<th>Grouping</th>
<th>20° Mean</th>
<th>20° SD</th>
<th>60° Mean</th>
<th>60° SD</th>
<th>85° Mean</th>
<th>85° SD</th>
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</thead>
<tbody>
<tr>
<td>RP1 (p/t) H</td>
<td>3.0</td>
<td>0.5</td>
<td>32.4</td>
<td>1.9</td>
<td>64.8</td>
<td>2.5</td>
</tr>
<tr>
<td>RP2 (p/t) H</td>
<td>3.3</td>
<td>0.4</td>
<td>23.5</td>
<td>2.8</td>
<td>63.5</td>
<td>1.7</td>
</tr>
<tr>
<td>RP3 (p/t) L</td>
<td>2.2</td>
<td>0.2</td>
<td>14.2</td>
<td>0.6</td>
<td>32.8</td>
<td>2.7</td>
</tr>
<tr>
<td>RP4 (p/t) L</td>
<td>7.0</td>
<td>0.7</td>
<td>33.5</td>
<td>1.3</td>
<td>49.9</td>
<td>2.6</td>
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</tbody>
</table>

*Average Values

**Prohesion – Gloss – 2 Cycles Summary**

<table>
<thead>
<tr>
<th>Grouping</th>
<th>20° Mean</th>
<th>20° SD</th>
<th>60° Mean</th>
<th>60° SD</th>
<th>85° Mean</th>
<th>85° SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>RP1 (p/t) H</td>
<td>1.2</td>
<td>0.1</td>
<td>10.0</td>
<td>0.6</td>
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<td>1.4</td>
</tr>
<tr>
<td>RP2 (p/t) H</td>
<td>1.1</td>
<td>0.1</td>
<td>5.2</td>
<td>0.6</td>
<td>41.8</td>
<td>1.5</td>
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<tr>
<td>RP3 (p/t) L</td>
<td>1.4</td>
<td>0.1</td>
<td>4.6</td>
<td>0.4</td>
<td>23.1</td>
<td>1.7</td>
</tr>
<tr>
<td>RP4 (p/t) L</td>
<td>6.4</td>
<td>1.4</td>
<td>33.2</td>
<td>3.5</td>
<td>45.9</td>
<td>4.3</td>
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</table>

*Average Values

**Flash Rusting Summary**

**Conical Mandrel Flexibility Summary**

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Pass/Fail</th>
<th>Failure Distance**</th>
<th>Adhesion Pass/Fail (after pass)***</th>
</tr>
</thead>
<tbody>
<tr>
<td>RP1 (p/t) H</td>
<td>Fail</td>
<td>5 1/16</td>
<td>--------</td>
</tr>
<tr>
<td>RP2 (p/t) H</td>
<td>Fail</td>
<td>9/16</td>
<td>--------</td>
</tr>
<tr>
<td>RP3 (p/t) L</td>
<td>Pass</td>
<td>--------</td>
<td>Pass</td>
</tr>
<tr>
<td>RP4 (p/t) L</td>
<td>Pass</td>
<td>--------</td>
<td>Pass</td>
</tr>
</tbody>
</table>

*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**

**Tests for Industrial Maintenance Coatings Summary**

9
### Taber Abrasion Summary

<table>
<thead>
<tr>
<th>Grouping</th>
<th>I, Wear Index</th>
<th>L, Weight Loss, mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 8:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rust Preventative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IM2 (p/i/t)</td>
<td>H 76.00</td>
<td>30.40</td>
</tr>
<tr>
<td>IM3 (p/i/t)</td>
<td>L 38.35</td>
<td>15.34</td>
</tr>
<tr>
<td>IM4 (p/i/t)</td>
<td>L 65.00</td>
<td>26.00</td>
</tr>
</tbody>
</table>

### Impact Resistance*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Last Pass</th>
<th>First Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 9:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Maintenance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IM2 (p/i/t)</td>
<td>H 30</td>
<td>40</td>
</tr>
<tr>
<td>IM3 (p/i/t)</td>
<td>L 73</td>
<td>83</td>
</tr>
<tr>
<td>IM4 (p/i/t)</td>
<td>L 10</td>
<td>20</td>
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</table>

*Average Values; 4 pound weight used

### Conical Mandrel Flexibility Summary*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Pass/Fail</th>
<th>Failure Distance**</th>
<th>Adhesion Pass/Fail (after pass)***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 9:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Maintenance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IM2 (p/i/t)</td>
<td>H Fail</td>
<td>4 19/32</td>
<td>--------</td>
</tr>
<tr>
<td>IM3 (p/i/t)</td>
<td>L Fail</td>
<td>6****</td>
<td>--------</td>
</tr>
<tr>
<td>IM4 (p/i/t)</td>
<td>L Fail</td>
<td>6****</td>
<td>--------</td>
</tr>
</tbody>
</table>

*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*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>PATTI</th>
<th>Battelle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 8:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial Maintenance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IM2 (p/i/t)</td>
<td>H 2160.7</td>
<td>Co – 30%, Ad –70%</td>
</tr>
<tr>
<td>IM3 (p/i/t)</td>
<td>L 2051.8</td>
<td>Co-2%, Ad-98%</td>
</tr>
<tr>
<td>IM4 (p/i/t)</td>
<td>L 2296.7</td>
<td>Co-3%, Ad – 97%</td>
</tr>
</tbody>
</table>

*Average Values

### QUV – Gloss – 0 Hours Summary*

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

**QUV – Gloss – 200 Hours Summary***

<table>
<thead>
<tr>
<th>Grouping</th>
<th>20° Mean</th>
<th>20° SD</th>
<th>60° Mean</th>
<th>60° SD</th>
<th>85° Mean</th>
<th>85° SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 9: Industrial Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IM2 (p/i/t)</td>
<td>H</td>
<td>25.2</td>
<td>3.3</td>
<td>64.5</td>
<td>5.0</td>
<td>64.1</td>
</tr>
<tr>
<td>IM3 (p/i/t)</td>
<td>L</td>
<td>48.4</td>
<td>3.5</td>
<td>80.6</td>
<td>4.2</td>
<td>74.1</td>
</tr>
<tr>
<td>IM4 (p/i/t)</td>
<td>L</td>
<td>48.4</td>
<td>2.9</td>
<td>79.7</td>
<td>1.1</td>
<td>85.6</td>
</tr>
</tbody>
</table>

*Average Values

**QUV – Gloss – 400 Hours Summary***

<table>
<thead>
<tr>
<th>Grouping</th>
<th>20° Mean</th>
<th>20° SD</th>
<th>60° Mean</th>
<th>60° SD</th>
<th>85° Mean</th>
<th>85° SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 9: Industrial Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IM2 (p/i/t)</td>
<td>H</td>
<td>19.7</td>
<td>3.5</td>
<td>60.6</td>
<td>3.6</td>
<td>65.8</td>
</tr>
<tr>
<td>IM3 (p/i/t)</td>
<td>L</td>
<td>38.2</td>
<td>6.6</td>
<td>77.6</td>
<td>4.7</td>
<td>82.2</td>
</tr>
<tr>
<td>IM4 (p/i/t)</td>
<td>L</td>
<td>21.0</td>
<td>1.7</td>
<td>66.0</td>
<td>1.0</td>
<td>82.8</td>
</tr>
</tbody>
</table>

*Average Values

**QUV – Gloss – 600 Hours Summary***

<table>
<thead>
<tr>
<th>Grouping</th>
<th>20° Mean</th>
<th>20° SD</th>
<th>60° Mean</th>
<th>60° SD</th>
<th>85° Mean</th>
<th>85° SD</th>
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</thead>
<tbody>
<tr>
<td>Group 9: Industrial Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IM2 (p/i/t)</td>
<td>H</td>
<td>6.1</td>
<td>1.1</td>
<td>42.3</td>
<td>3.5</td>
<td>61.6</td>
</tr>
<tr>
<td>IM3 (p/i/t)</td>
<td>L</td>
<td>31.8</td>
<td>3.3</td>
<td>75.4</td>
<td>3.9</td>
<td>76.6</td>
</tr>
<tr>
<td>IM4 (p/i/t)</td>
<td>L</td>
<td>7.7</td>
<td>0.3</td>
<td>49.3</td>
<td>1.9</td>
<td>82.0</td>
</tr>
</tbody>
</table>

*Average Values

**QUV – Gloss 800 Hours Summary***

<table>
<thead>
<tr>
<th>Grouping</th>
<th>20° Mean</th>
<th>20° SD</th>
<th>60° Mean</th>
<th>60° SD</th>
<th>85° Mean</th>
<th>85° SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 9: Industrial Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IM2 (p/i/t)</td>
<td>H</td>
<td>1.9</td>
<td>0.1</td>
<td>24.1</td>
<td>1.7</td>
<td>63.7</td>
</tr>
<tr>
<td>IM3 (p/i/t)</td>
<td>L</td>
<td>31.9</td>
<td>2.6</td>
<td>67.9</td>
<td>2.5</td>
<td>78.1</td>
</tr>
<tr>
<td>IM4 (p/i/t)</td>
<td>L</td>
<td>3.6</td>
<td>0.2</td>
<td>34.1</td>
<td>0.7</td>
<td>78.6</td>
</tr>
</tbody>
</table>

*Average Values

**QUV – Gloss 1000 Hours Summary***

<table>
<thead>
<tr>
<th>Grouping</th>
<th>20° Mean</th>
<th>20° SD</th>
<th>60° Mean</th>
<th>60° SD</th>
<th>85° Mean</th>
<th>85° SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 9: Industrial Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IM2 (p/i/t)</td>
<td>H</td>
<td>1.5</td>
<td>0.1</td>
<td>13.3</td>
<td>1.2</td>
<td>58.8</td>
</tr>
<tr>
<td>IM3 (p/i/t)</td>
<td>L</td>
<td>25.4</td>
<td>5.3</td>
<td>67.2</td>
<td>4.5</td>
<td>74.0</td>
</tr>
<tr>
<td>IM4 (p/i/t)</td>
<td>L</td>
<td>3.0</td>
<td>0.2</td>
<td>22.9</td>
<td>1.5</td>
<td>76.9</td>
</tr>
</tbody>
</table>

*Average Values

**QUV – Color, ΔE Summary***

<table>
<thead>
<tr>
<th>Grouping</th>
<th>ΔE, 200 Hours</th>
<th>ΔE, 400 Hours</th>
<th>ΔE, 600 Hours</th>
<th>ΔE, 800 Hours</th>
<th>ΔE, 1000 Hours</th>
</tr>
</thead>
</table>

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### MEK Rubs Summary

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Gloss Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM2 (p/i/t)</td>
<td>H</td>
</tr>
<tr>
<td>IM3 (p/i/t)</td>
<td>L</td>
</tr>
<tr>
<td>IM4 (p/i/t)</td>
<td>L</td>
</tr>
</tbody>
</table>

*Average Values

### Prohesion – Gloss – 0 Cycles Summary

<table>
<thead>
<tr>
<th>Grouping</th>
<th>20° Mean</th>
<th>20° SD</th>
<th>60° Mean</th>
<th>60° SD</th>
<th>85° Mean</th>
<th>85° SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM2 (p/i/t)</td>
<td>H</td>
<td>29.3</td>
<td>3.8</td>
<td>70.0</td>
<td>3.1</td>
<td>69.2</td>
</tr>
<tr>
<td>IM3 (p/i/t)</td>
<td>L</td>
<td>48.2</td>
<td>3.3</td>
<td>83.2</td>
<td>2.3</td>
<td>77.3</td>
</tr>
<tr>
<td>IM4 (p/i/t)</td>
<td>L</td>
<td>60.9</td>
<td>3.4</td>
<td>84.9</td>
<td>1.2</td>
<td>79.6</td>
</tr>
</tbody>
</table>

*Average Values

### Prohesion – Gloss – 1 Cycle Summary

<table>
<thead>
<tr>
<th>Grouping</th>
<th>20° Mean</th>
<th>20° SD</th>
<th>60° Mean</th>
<th>60° SD</th>
<th>85° Mean</th>
<th>85° SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM2 (p/i/t)</td>
<td>H</td>
<td>27.0</td>
<td>3.9</td>
<td>62.4</td>
<td>5.9</td>
<td>60.1</td>
</tr>
<tr>
<td>IM3 (p/i/t)</td>
<td>L</td>
<td>32.6</td>
<td>4.1</td>
<td>64.9</td>
<td>1.8</td>
<td>67.4</td>
</tr>
<tr>
<td>IM4 (p/i/t)</td>
<td>L</td>
<td>39.8</td>
<td>2.3</td>
<td>71.0</td>
<td>1.1</td>
<td>72.1</td>
</tr>
</tbody>
</table>

*Average Values

### Prohesion – Gloss – 2 Cycles Summary

<table>
<thead>
<tr>
<th>Grouping</th>
<th>20° Mean</th>
<th>20° SD</th>
<th>60° Mean</th>
<th>60° SD</th>
<th>85° Mean</th>
<th>85° SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM2 (p/i/t)</td>
<td>H</td>
<td>17.7</td>
<td>3.3</td>
<td>55.0</td>
<td>2.6</td>
<td>59.1</td>
</tr>
<tr>
<td>IM3 (p/i/t)</td>
<td>L</td>
<td>23.7</td>
<td>1.9</td>
<td>60.1</td>
<td>1.6</td>
<td>66.4</td>
</tr>
<tr>
<td>IM4 (p/i/t)</td>
<td>L</td>
<td>14.0</td>
<td>1.3</td>
<td>52.6</td>
<td>1.5</td>
<td>68.8</td>
</tr>
</tbody>
</table>

*Average Values

### Prohesion – Gloss – 3 Cycles Summary

<table>
<thead>
<tr>
<th>Grouping</th>
<th>20° Mean</th>
<th>20° SD</th>
<th>60° Mean</th>
<th>60° SD</th>
<th>85° Mean</th>
<th>85° SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM2 (p/i/t)</td>
<td>H</td>
<td>5.8</td>
<td>1.1</td>
<td>36.7</td>
<td>3.2</td>
<td>56.6</td>
</tr>
<tr>
<td>IM3 (p/i/t)</td>
<td>L</td>
<td>15.8</td>
<td>2.6</td>
<td>50.2</td>
<td>2.7</td>
<td>60.1</td>
</tr>
<tr>
<td>IM4 (p/i/t)</td>
<td>L</td>
<td>4.3</td>
<td>0.2</td>
<td>36.8</td>
<td>1.9</td>
<td>67.3</td>
</tr>
</tbody>
</table>

*Average Values
## Prohesion – Color ΔE Summary*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>ΔE, After 1 Cycle</th>
<th>ΔE, After 2 Cycles</th>
<th>ΔE, After 3 Cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 9:</td>
<td><strong>Industrial Maintenance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IM2 (p/i/t)</td>
<td>H</td>
<td>0.83</td>
<td>1.85</td>
</tr>
<tr>
<td>IM3 (p/i/t)</td>
<td>L</td>
<td>3.18</td>
<td>2.93</td>
</tr>
<tr>
<td>IM4 (p/i/t)</td>
<td>L</td>
<td>2.99</td>
<td>3.25</td>
</tr>
</tbody>
</table>

*Average Values
## Task 1 - Testing Protocol

### Tests for General Properties of all paints

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

### Tests for Rust Preventative Coatings

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

### Tests for Industrial Maintenance Coatings

<table>
<thead>
<tr>
<th>Property</th>
<th>Standard</th>
<th>Number of Replicates</th>
<th>Substrate</th>
<th>Film Thickness/Bar type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taber Abrasion</td>
<td>ASTM D4060</td>
<td>3</td>
<td>Steel Taber panel</td>
<td>Coated by weight</td>
</tr>
<tr>
<td>Impact Resistance</td>
<td>ASTM D522 Rev A</td>
<td>3</td>
<td>Steel</td>
<td>Coated by weight</td>
</tr>
<tr>
<td>Adhesion on Steel (unprimed)</td>
<td>Batelle Torque Method</td>
<td>3</td>
<td>Steel</td>
<td>Coated by weight</td>
</tr>
<tr>
<td>QUV</td>
<td>ASTM D4587</td>
<td>3</td>
<td>Steel</td>
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<td>ASTM G85 Annex A5</td>
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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 analogous 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

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<th>Pub. VOC</th>
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<th>3 Replicates Each</th>
<th>W1</th>
<th>W2</th>
<th>SA</th>
<th>V (%vol)</th>
<th>AVG V</th>
<th>N (%NV)</th>
<th>AVG N</th>
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#### Group 9: Industrial Maintenance

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<th>W2</th>
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<th>V (%vol)</th>
<th>AVG V</th>
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## Tests for Rust Preventative Coatings

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### Impact Resistance

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### Adhesion on Steel

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### Flow & Leveling

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### Prohesion – Gloss – 0 Cycles

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**Prohesion – Gloss – 1 Cycle**

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**Prohesion – Gloss – 2 Cycles**

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<tr>
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**Flash Rusting**

**Flexibility**

<table>
<thead>
<tr>
<th>Group 8</th>
<th>Rust Preventative</th>
<th>Pass/Fail</th>
<th>Failure Dist. (in)</th>
<th>Adhesion Pass/Fail</th>
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<tbody>
<tr>
<td>RP1 (p/t) &gt; 100g/L</td>
<td>H</td>
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<td>4 3/4</td>
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</tr>
<tr>
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<td>5 3/16</td>
<td>------</td>
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<td>5 1/4</td>
<td>------</td>
<td></td>
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<tr>
<td>Average</td>
<td>Fail</td>
<td>5 1/16</td>
<td>------</td>
<td></td>
</tr>
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<td>RP2 (p/t)</td>
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<td>H</td>
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</tr>
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<td>3/8</td>
<td>------</td>
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<td>5/8</td>
<td>------</td>
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<td>9/16</td>
<td>------</td>
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<tr>
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<td>L</td>
<td>Pass</td>
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Tests for Industrial Maintenance Coatings

Taber Abrasion

Impact Resistance

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<th>Industrial Maint.</th>
<th>Last Pass</th>
<th>First Fail</th>
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<td>IM2 (p/i/t)</td>
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<td>Replicate 2</td>
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<td>80</td>
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<td>80</td>
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Flexibility

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<tr>
<th>Group 9:</th>
<th>Industrial Maintenance</th>
<th>Pass/Fail</th>
<th>Failure Dist. (in)</th>
<th>Adhesion Pass/Fail</th>
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<tr>
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<td>H</td>
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<td>4 1/8</td>
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<td>Replicate 3</td>
<td>Fail</td>
<td>4 5/8</td>
<td>------</td>
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<td>4 19/32</td>
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<tr>
<td>IM3 (p/i/t)</td>
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<td>------</td>
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<td>Average</td>
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<td>6</td>
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<tr>
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Adhesion on Metal
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<tbody>
<tr>
<td>IM2 (p/i/t) &lt; 100g/L</td>
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<td>2446.4</td>
<td>PAd-95%, Pco-5%</td>
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<tr>
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<td>56.1</td>
<td>2283.1</td>
<td>PCO-70, PAd-30, IAd-5</td>
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<tr>
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<td>1752.5</td>
<td>PAd-85, Pco-15%</td>
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<td>2160.7</td>
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<tr>
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<td>80.6</td>
<td>3303.5</td>
<td>PCo-92, PAd-3, IAd-5</td>
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<td>1711.7</td>
<td>PAd-98, IAd-2</td>
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<td>PCo-1, PAd-99</td>
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<td>2119.8</td>
<td>PCo-4, PAd-96</td>
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<td>2568.8</td>
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<td>2296.7</td>
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**QUV - Gloss – 0 Hours**

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Gloss (5 readings per replicate) - QUV 0 Hours</th>
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<tbody>
<tr>
<td>Group 9: Industrial Maint.</td>
<td>20° Mean</td>
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<tr>
<td>IM2 (p/i/t) &gt; 100g/L</td>
<td>H</td>
</tr>
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<td>Replicate 2</td>
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</tr>
<tr>
<td>Replicate 3</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td></td>
</tr>
<tr>
<td>IM3 (p/i/t) ≤ 100g/L</td>
<td>L</td>
</tr>
<tr>
<td>Replicate 2</td>
<td></td>
</tr>
<tr>
<td>Replicate 3</td>
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</tr>
<tr>
<td>Average</td>
<td></td>
</tr>
<tr>
<td>IM4 (p/i/t) ≤ 100g/L</td>
<td>L</td>
</tr>
<tr>
<td>Replicate 2</td>
<td></td>
</tr>
<tr>
<td>Replicate 3</td>
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**QUV – Gloss – 200 Hours**

<table>
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<th>Gloss (5 readings per replicate) - QUV 200 Hours</th>
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<td>Replicate 3</td>
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</tr>
<tr>
<td>Average</td>
<td></td>
</tr>
<tr>
<td>IM3 (p/i/t) ≤ 100g/L</td>
<td>L</td>
</tr>
<tr>
<td>Replicate 2</td>
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</tr>
<tr>
<td>Replicate 3</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td></td>
</tr>
<tr>
<td>IM4 (p/i/t) ≤ 100g/L</td>
<td>L</td>
</tr>
<tr>
<td>Replicate 2</td>
<td></td>
</tr>
<tr>
<td>Replicate 3</td>
<td></td>
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<tr>
<td>Average</td>
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</table>
### QUV – Gloss – 400 Hours

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<td>Replicate 3</td>
</tr>
<tr>
<td></td>
<td>Average</td>
</tr>
<tr>
<td></td>
<td>IM3 (p/i/t) ≤ 100g/L</td>
</tr>
<tr>
<td></td>
<td>Replicate 2</td>
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<tr>
<td></td>
<td>Replicate 3</td>
</tr>
<tr>
<td></td>
<td>Average</td>
</tr>
<tr>
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<td>IM4 (p/i/t) ≤ 100g/L</td>
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<td>Replicate 2</td>
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<td>Replicate 3</td>
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### QUV – Gloss – 600 Hours

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<td>Replicate 3</td>
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<td>Average</td>
</tr>
<tr>
<td></td>
<td>IM3 (p/i/t) ≤ 100g/L</td>
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<td>Replicate 3</td>
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<td>Average</td>
</tr>
<tr>
<td></td>
<td>IM4 (p/i/t) ≤ 100g/L</td>
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<td>Replicate 3</td>
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### QUV – Gloss – 800 Hours

<table>
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<td>IM2 (p/i/t) &gt; 100g/L</td>
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<td>Replicate 3</td>
</tr>
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<td>Average</td>
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<tr>
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<td>IM3 (p/i/t) ≤ 100g/L</td>
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<td></td>
<td>Replicate 3</td>
</tr>
<tr>
<td></td>
<td>Average</td>
</tr>
<tr>
<td></td>
<td>IM4 (p/i/t) ≤ 100g/L</td>
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<td>Replicate 3</td>
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<td></td>
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<td>Grouping</td>
<td>Gloss (5 readings per replicate) - QUV 1000 Hours</td>
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<tr>
<td></td>
<td>Replicate 3</td>
</tr>
<tr>
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<td>Average</td>
</tr>
<tr>
<td>IM3 (p/i/t) ≤ 100g/L</td>
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<td>Replicate 3</td>
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<tr>
<td>IM4 (p/i/t) ≤ 100g/L</td>
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### QUV – Color, Continued

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<td>Z</td>
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### MEK Rubs

<table>
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<th>Gloss Loss</th>
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</tr>
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<td>IM2 (p/i/t) &gt; 100g/L H</td>
<td>After 15 Cycles</td>
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<tr>
<td>Replicate 2</td>
<td>After 15 Cycles</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>After 15 Cycles</td>
</tr>
<tr>
<td>Average</td>
<td>After 15 Cycles</td>
</tr>
<tr>
<td>IM3 (p/i/t) ≤ 100g/L L</td>
<td>Gloss Loss</td>
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<td>Gloss Loss</td>
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<td>Replicate 3</td>
<td>Gloss Loss</td>
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<tr>
<td>Average</td>
<td>Gloss Loss</td>
</tr>
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<td>Trace Gloss Loss</td>
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<td>Replicate 3</td>
<td>Trace Gloss Loss</td>
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<tr>
<td>Average</td>
<td>Trace Gloss Loss</td>
</tr>
</tbody>
</table>

### Prohesion – Gloss – 0 Cycles

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Gloss (5 readings per replicate) - Prohesion 0 Cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 9: Industrial Maint.</td>
<td></td>
</tr>
<tr>
<td>IM2 (p/i/t) &gt; 100g/L H</td>
<td>20° Mean</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>31.8</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>26.0</td>
</tr>
<tr>
<td>Average</td>
<td>29.3</td>
</tr>
<tr>
<td>IM3 (p/i/t) ≤ 100g/L L</td>
<td>20° Mean</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>46.2</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>58.5</td>
</tr>
<tr>
<td>Average</td>
<td>48.2</td>
</tr>
<tr>
<td>IM4 (p/i/t) ≤ 100g/L L</td>
<td>20° Mean</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>64.5</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>51.4</td>
</tr>
<tr>
<td>Average</td>
<td>60.9</td>
</tr>
</tbody>
</table>

### Prohesion – Gloss – 1 Cycle

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Gloss (5 readings per replicate) - Prohesion 1 Cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 9: Industrial Maint.</td>
<td></td>
</tr>
<tr>
<td>IM2 (p/i/t) &gt; 100g/L H</td>
<td>20° Mean</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>26.5</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>26.2</td>
</tr>
<tr>
<td>Average</td>
<td>27.0</td>
</tr>
<tr>
<td>IM3 (p/i/t) ≤ 100g/L L</td>
<td>20° Mean</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>29.5</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>39.0</td>
</tr>
<tr>
<td>Average</td>
<td>32.6</td>
</tr>
<tr>
<td>IM4 (p/i/t) ≤ 100g/L L</td>
<td>20° Mean</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>33.3</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>38.3</td>
</tr>
<tr>
<td>Average</td>
<td>39.8</td>
</tr>
</tbody>
</table>

### Prohesion – Gloss – 2 Cycles

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Gloss (5 readings per replicate) - Prohesion 2 Cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 9: Industrial Maint.</td>
<td>20° Mean</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>IM2 (p/i/t) &gt; 100g/L</td>
<td>H</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>18.5</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>16.9</td>
</tr>
<tr>
<td>Average</td>
<td>17.7</td>
</tr>
<tr>
<td>IM3 (p/i/t) ≤ 100g/L</td>
<td>L</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>29.6</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>15.6</td>
</tr>
<tr>
<td>Average</td>
<td>23.7</td>
</tr>
<tr>
<td>IM4 (p/i/t) ≤ 100g/L</td>
<td>L</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>14.0</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>15.9</td>
</tr>
<tr>
<td>Average</td>
<td>14.0</td>
</tr>
</tbody>
</table>

Prohesion – Gloss – 3 Cycles

<table>
<thead>
<tr>
<th>Grouping</th>
<th>20° Mean</th>
<th>20° Std. Dev.</th>
<th>60° Mean</th>
<th>60° Std. Dev.</th>
<th>85° Mean</th>
<th>85° Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM2 (p/i/t) &gt; 100g/L</td>
<td>H</td>
<td>5.3</td>
<td>1.2</td>
<td>34.8</td>
<td>4.0</td>
<td>58.0</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>5.9</td>
<td>0.2</td>
<td>38.1</td>
<td>2.6</td>
<td>61.6</td>
<td>2.6</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>6.1</td>
<td>2.0</td>
<td>37.1</td>
<td>3.0</td>
<td>50.2</td>
<td>4.8</td>
</tr>
<tr>
<td>Average</td>
<td>5.8</td>
<td>1.1</td>
<td>36.7</td>
<td>3.2</td>
<td>56.6</td>
<td>3.0</td>
</tr>
<tr>
<td>IM3 (p/i/t) ≤ 100g/L</td>
<td>L</td>
<td>14.9</td>
<td>3.8</td>
<td>48.9</td>
<td>4.0</td>
<td>57.9</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>16.8</td>
<td>2.0</td>
<td>51.4</td>
<td>1.6</td>
<td>68.9</td>
<td>1.4</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>15.8</td>
<td>2.0</td>
<td>50.3</td>
<td>2.6</td>
<td>53.4</td>
<td>1.0</td>
</tr>
<tr>
<td>Average</td>
<td>15.8</td>
<td>2.6</td>
<td>50.2</td>
<td>2.7</td>
<td>60.1</td>
<td>1.2</td>
</tr>
<tr>
<td>IM4 (p/i/t) ≤ 100g/L</td>
<td>L</td>
<td>3.7</td>
<td>0.2</td>
<td>33.5</td>
<td>2.6</td>
<td>67.1</td>
</tr>
<tr>
<td>Replicate 2</td>
<td>4.8</td>
<td>0.2</td>
<td>40.1</td>
<td>1.8</td>
<td>75.9</td>
<td>3.2</td>
</tr>
<tr>
<td>Replicate 3</td>
<td>4.5</td>
<td>0.2</td>
<td>36.9</td>
<td>1.2</td>
<td>58.8</td>
<td>0.6</td>
</tr>
<tr>
<td>Average</td>
<td>4.3</td>
<td>0.2</td>
<td>36.8</td>
<td>1.9</td>
<td>67.3</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Prohesion - Color
APPENDIX D

Excerpts from CARB & SCAQMD Reactivity Study
Reactivity & Availability

SCAQMD Reactivity Study

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 RRGW. The RRGW’s efforts to date have found that different VOC species have varying reactive properties to form ozone under the same NOₓ environment. However, RRGW’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 O₃ formation under low NOₓ 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®, 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

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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 O₃ 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.

<table>
<thead>
<tr>
<th>Compound or Mixture</th>
<th>MIR [a] Previous</th>
<th>Revised</th>
<th>PM Impact or Approximate SOA Yields [b]</th>
<th>Discussion of Mechanism Evaluation Results [c]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene Glycol</td>
<td>3.36</td>
<td>3.63</td>
<td>Lower PM than base case</td>
<td>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</td>
</tr>
<tr>
<td>Propylene Glycol</td>
<td>2.74</td>
<td>No change</td>
<td>Lower PM than base case</td>
<td>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</td>
</tr>
<tr>
<td>Texanol® (Isobutyrate monoesters of 2,2,4-trimethyl-1,3-pentanediol) [d]</td>
<td>0.88</td>
<td>No change</td>
<td>No net effect on PM formed evident</td>
<td>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.</td>
</tr>
<tr>
<td>2-(2-butoxyethoxy)-ethanol (DGBE)</td>
<td>2.86</td>
<td>No change</td>
<td>14 - 26%</td>
<td></td>
</tr>
<tr>
<td>Benzyl Alcohol</td>
<td>None</td>
<td>4.89</td>
<td>~30%</td>
<td>Mechanism developed for this project and adjusted to fit the chamber data. Mechanism performance comparable to that for other aromatic compounds.</td>
</tr>
</tbody>
</table>

Hydrocarbon Solvents Studied for CARB Project [e]

<table>
<thead>
<tr>
<th>Compound or Mixture</th>
<th>MIR [a] Previous</th>
<th>Revised</th>
<th>PM Impact or Approximate SOA Yields [b]</th>
<th>Discussion of Mechanism Evaluation Results [c]</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMP Naphtha, Primarily C&lt;sub&gt;7&lt;/sub&gt;-C&lt;sub&gt;9&lt;/sub&gt; mixed alkanes</td>
<td>1.41</td>
<td>1.35</td>
<td>0.1 - 0.7%</td>
<td>The experimental results for the primarily alkane, petroleum distillate-derived hydrocarbon solvents were generally consistent with the chamber data.</td>
</tr>
<tr>
<td>Dearomatized Mixed Alkanes, Primarily C&lt;sub&gt;10&lt;/sub&gt;-C&lt;sub&gt;12&lt;/sub&gt; (ASTM-1C)</td>
<td>0.91</td>
<td>0.96</td>
<td>~0.2%</td>
<td></td>
</tr>
<tr>
<td>Reduced Aromatics Mineral Spirits, Primarily C&lt;sub&gt;10&lt;/sub&gt;-C&lt;sub&gt;12&lt;/sub&gt; mixed alkanes with 6% aromatics (ASTM-1B)</td>
<td>1.21</td>
<td>1.26</td>
<td>0.6 - 0.7%</td>
<td></td>
</tr>
<tr>
<td>Compound or Mixture</td>
<td>MIR [a] Previous</td>
<td>MIR [a] Revised</td>
<td>PM Impact or Approximate SOA Yields [b]</td>
<td>Discussion of Mechanism Evaluation Results [c]</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------</td>
<td>-----------------</td>
<td>----------------------------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>Regular mineral spirits, Primarily C\textsubscript{10}-C\textsubscript{12} mixed alkanes with 19% aromatics (ASTM-1A)</td>
<td>1.82</td>
<td>1.97</td>
<td>0.3 - 0.8%</td>
<td>The experimental results were generally consistent with the chamber data.</td>
</tr>
<tr>
<td>Synthetic isoparaffinic alkanes, primarily C\textsubscript{10}-C\textsubscript{12} branched alkanes (ASTM-3C1)</td>
<td>0.81</td>
<td>1.1 - 1.5 [f]</td>
<td>No net effect on PM formed evident</td>
<td>Data not well simulated by the model. Model probably underpredicts atmospheric ozone formation by 25-75%, depending on the cause of the discrepancy.</td>
</tr>
<tr>
<td>Aromatic 100 (Primarily C\textsubscript{9}-C\textsubscript{10} alkylbenzenes)</td>
<td>7.51</td>
<td>7.70</td>
<td>0.3 - 0.4%</td>
<td>Experimental results representing MIR conditions generally consistent with model predictions. But model underpredicted O\textsubscript{3} inhibition in low NO\textsubscript{x} conditions and has other problems.</td>
</tr>
</tbody>
</table>

[a] Maximum incremental reactivity in gm O\textsubscript{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.


[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. 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.

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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 (NH₄)₂SO₄ or NH₄HSO₄ seed aerosol up to 10 μg/m³.
- 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
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:

\[
\text{PWMIR}, \text{ g O}_3/\text{g product} = [Wt\%]_1\times[MIR]_1 + [Wt\%]_2\times[MIR]_2 + \ldots + [Wt\%]_n\times[MIR]_n
\]

where

- \([Wt\%]_i = \text{the weight percent of each ingredient in a coating product (e.g., 0.25 for 25\%})\)
- \([MIR]_i = \text{the MIR value of each ingredient in a coating product, g O}_3/\text{g TOG}\)
- \(n = \text{the total number of ingredients in a coating product}\)

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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:

\[
SWAMIR = \frac{\sum [\text{Sales}_i \times \text{PWMIR}_i]}{\sum \text{Sales}}
\]

where

- \([\text{Sales}, \text{gals}]_i\) = the sales of product “i”, gallons
- \([\text{PWMIR}]_i\) = 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

-10-
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)

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<td>0.10</td>
<td>0.19</td>
<td>0.85</td>
<td>0.21</td>
<td>0.26</td>
<td>0.75</td>
<td>0.74</td>
<td>0.79</td>
<td>3.99</td>
<td>1.81</td>
<td>1.65</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 2-3: Sales-Weighted Average MIR Values in 50-g/l Ranges (grams ozone/gram product)

<table>
<thead>
<tr>
<th>Coating Category</th>
<th>0-50</th>
<th>51-100</th>
<th>101-150</th>
<th>151-200</th>
<th>201-250</th>
<th>251-300</th>
<th>301-350</th>
<th>351-400</th>
<th>401-450</th>
<th>451-500</th>
<th>501-550</th>
<th>551-600</th>
<th>601-650</th>
<th>651-700</th>
<th>&gt; 700</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waterproofing Sealers</td>
<td>0.00</td>
<td>0.07</td>
<td>0.10</td>
<td>0.36</td>
<td>0.47</td>
<td>0.60</td>
<td>0.35</td>
<td>0.43</td>
<td>0.65</td>
<td>0.01</td>
<td>0.83</td>
<td>1.13</td>
<td>0.85</td>
<td>1.73</td>
<td>1.54</td>
</tr>
<tr>
<td>Wood Preservatives</td>
<td>0.06</td>
<td>0.30</td>
<td>0.10</td>
<td>0.11</td>
<td>0.31</td>
<td>0.26</td>
<td>0.68</td>
<td>0.48</td>
<td>0.72</td>
<td>1.22</td>
<td></td>
<td></td>
<td></td>
<td>1.13</td>
<td>1.67</td>
</tr>
</tbody>
</table>

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.