

BOARD MEETING DATE: July 21, 2000

AGENDA NO. 30

REPORT: Annual Status Report on Rule 1113 - Architectural Coatings

SYNOPSIS: At its August 13, 1999 meeting, the Board approved a workplan for implementing the amendments to Rule 1113. This report summarizes the activities of District staff, the Working Group, Averaging/Niche Markets Sub-Group, and the Technical Advisory Committee; and the progress made relative to the Essential Public Service Coating technology assessment. The report also includes staff's recommendations as a result of the technology assessment for flat coatings. Both technology assessments are either requirements contained in the rule or part of the Board's resolution.

COMMITTEE: Not applicable

RECOMMENDED ACTION:
Receive and file.

Barry R. Wallerstein, D.Env.
Executive Officer

JPB:LTT:NB

Background

On May 14, 1999, the Board approved the amendments to Rule 1113 – Architectural Coatings, with a direction to staff to work with industry to address certain concerns raised at the public hearing, and to report back to the Board in 90 days. Subsequently, in June 1999, three lawsuits were filed challenging the amendments, brought by Sherwin-Williams, the National Paint Coatings Association (“NPCA”), and the California Paint Alliance (incorporated as EL RAP) which are currently ongoing. On August 13, 1999, the Board approved staff's workplan to implement the Board's directive.

This report highlights staff's efforts in executing the workplan to implement the amendments. Specifically, it summarizes the activities of the various work groups formed, provides a status report on the ongoing technology assessment for essential public service coatings, and presents staff's findings on the technology assessment conducted for flat coatings that was part of the Rule 1113 amendments adopted in November 1996.

Meetings

Working Group

Pursuant to the workplan approved by the Board, the objective of the working group was to provide a forum for discussion of technological advancements in coatings material, market trends, and product performance related to Rule 1113 – Architectural Coatings. With regards to implementation of the workplan, staff held four meetings with the working group on October 12, 1999, November 3, 1999, January 19, 2000, and May 17, 2000. In these meetings, staff provided updates to the Phase II Assessment Study for Architectural Coatings, developed and finalized the implementation clarifications to the amended rule, and discussed the flat coatings technology assessment. Various other topics, such as the Settlement Agreement pertaining to the SIP litigation brought by several environmental organizations and the 1999 Amendments to the 1997 Air Quality Management Plan and their impact on the architectural coatings industry, were also discussed at these meetings. Lastly, staff presented the potential impacts of EPA's Draft Economic Incentive Program Guidance Document on the averaging program.

Averaging/Niche Market Subgroup

Pursuant to the workplan approved by the Board, the objective of the averaging/niche market subgroup is to implement the averaging compliance option program, as well as monitor and address issues related to niche markets. Staff met with the averaging/niche market subgroup on September 9, 1999, October 12, 1999, November 3, 1999, December 15, 1999, and January 20, 2000. In these meetings, staff worked with interested industry members on developing an enforceable program, as well as the averaging implementation guidance document. This subgroup was placed on hold in February 2000, in response to the CARB's interest in developing an alternative averaging program for their Suggested Control Measure (SCM). However, this subgroup continued to work with CARB staff on the concept of a statewide averaging program. CARB has yet to finalize the averaging program to be included in the SCM. Nonetheless, in response to industry requests, staff has agreed to reconvene this subgroup to complete the averaging implementation guidance document.

Technical Advisory Committee (TAC)

Pursuant to the workplan approved by the Board, the objective of the technical advisory committee was to provide technical oversight of the Phase II Assessment Study and future technology assessments, including selection of coatings, relevant testing, and the re-

port formats. Additionally, the TAC will evaluate data to identify links between performance characteristics and emission potential of architectural coatings.

In conjunction with the TAC, staff has thoroughly reviewed the results of the laboratory portion of the Phase II Assessment Study for Architectural Coatings. In response to concerns expressed by some members of the TAC, National Technical Systems (NTS), the contracted laboratory, re-evaluated the dry time test based on a protocol developed by the TAC. This review did not result in changes to the final data, but did clarify the deviation from a standardized test method. The TAC has also reviewed the actual panels for numerous laboratory tests during a site visit to the NTS laboratory in Sacramento. Additionally, based on comments by the TAC, NTS re-evaluated the ranking for the leveling analysis based on an agreed modification to the test method. This re-evaluation also did not result in any modifications to the conclusions derived from the original laboratory test data. Furthermore, the TAC reviewed the protocol and subsequent results of the accelerated outdoor weathering data. This data paralleled the results of the accelerated laboratory weathering. In early April, NTS initiated the real-time exposure study by placing coated panels on exposure racks in Saugus and El Segundo to obtain exposure data in the cooler, more humid marine environment, and a hotter, drier climate.

Currently, the TAC is developing the protocol for a thorough evaluation of application characteristics for the coatings included in the NTS study. Although the protocol has been finalized by the TAC, a contractor has not yet been selected. The TAC is currently evaluating three potential approaches for selecting the contractor.

Essential Public Service Coating – Technology Assessment

During the rule development phase of the May 14, 1999 amendments to Rule 1113 – Architectural Coatings, the Board directed staff to provide technical oversight and funding to the Essential Public Service Agency technology assessment. In response to this direction, as of September 1999, staff formed a committee to accomplish the separate technology assessment for the Essential Public Service Agencies. This committee is comprised of representatives from Metropolitan Water District (MWD), Department of Water Resources, Cal Trans, Department of Water and Power, as well as the Southern California Association of Publicly Owned Treatment Works (SCAP). Over the past eight months, the committee has met on a regular basis to identify service environments of concern, and has developed a list of coatings to be tested, based on a mutually-agreed upon testing protocol. The Committee has selected MWD as the primary contractor for the assessment, since they have an active corrosion testing laboratory and already conduct such assessments for some of the participating agencies. Of the agencies listed above, SCAP may choose to conduct a separate study to address specific service conditions found in wastewater treatment facilities. The committee has developed a Letter of Understanding, which is an agreement-in-principle to participate in this joint analysis, as well as a workplan to define the scope and commitments made by the signatory agencies.

Actual laboratory testing is scheduled to start over the next few weeks. Each individual agency will sign engineering service agreements with MWD to conduct the studies. The District plans to co-fund this technology assessment with the listed agencies.

Flat Coatings – Technology Assessment

During the November 1996 amendments to Rule 1113, the Board approved a staff proposal to include a provision for a technology assessment for flat coatings prior to implementation of future limits. This technology assessment is to assess the technical feasibility of implementing the 100 g/l VOC limit, scheduled for implementation in July 2001.

In conducting this technology assessment for flats, staff relied on two sources that provided a wealth of information:

- A. The 1998 CARB Survey of Architectural Coatings, and;
- B. Recommendations based on actual tests conducted by the Master Painters Institute (MPI).

1998 CARB Survey

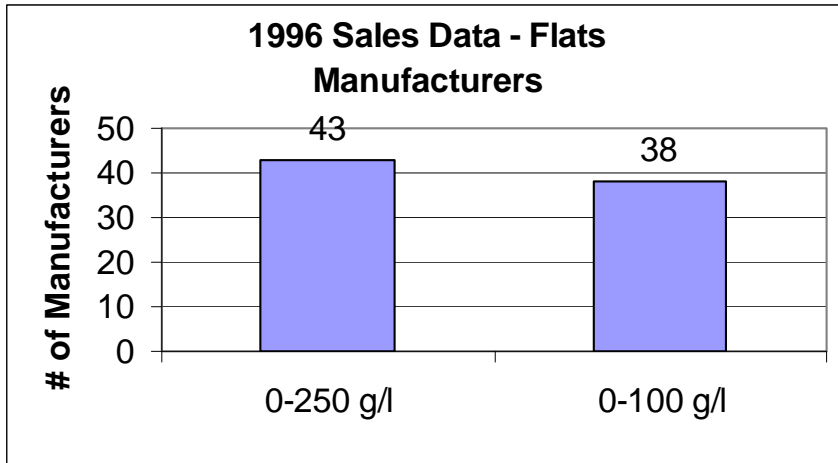
As a first step of the technology assessment, staff evaluated the 1998 CARB Survey of Architectural Coatings. This comprehensive survey, used for establishing an emissions baseline, relied upon sales of architectural coatings in 1996 from over 150 manufacturers.

The following summary highlights data extracted from the CARB survey, as well as staff's analyses of the data for flat coatings.

A total of 43 manufacturers submitted information on flat coatings, of which 38 (88%) have formulations that have a VOC level at or below 100 g/l. (Figure 1) Total flat coating sales in California were 31,777,127 gallons, of which 15,475,461 gallons were for flat coatings with a VOC level of 100 g/l or less. This equates to approximately 49% of all flat coatings sold in 1996. (Figure 2)

A more detailed review of flat sales data shows reporting by interior, exterior, dual (both interior and exterior), and unidentified uses. For the coatings with a VOC content between 0 and 100 g/l (549 products), interior flats accounted for approximately 47% of the total products, and exterior flats represented a little over 21% of the products.

Figure 1

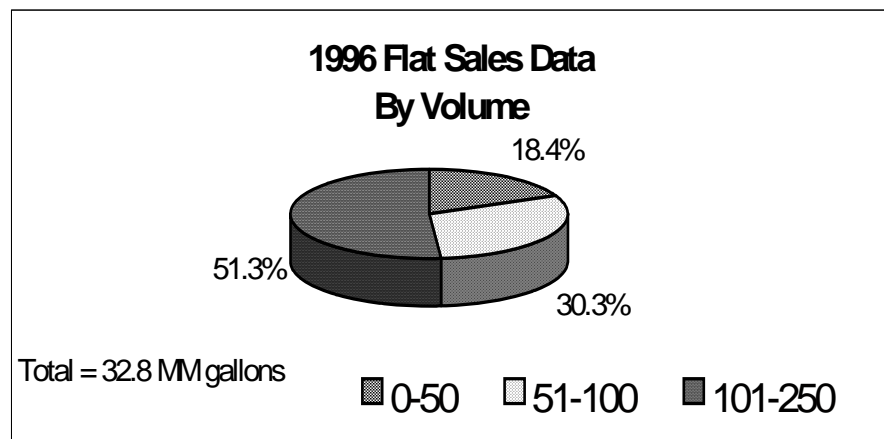


Approximately 10% accounted for dual use, and 22% were unidentified. An additional analysis for the products with a VOC content between 101-250 g/l (611 products) shows that 29% are for interior use, and 40% are for exterior use. The dual use coatings represented 9% of the products and 23%

were unidentified. Figure 3 summarizes this analysis by illustrating the data and comparing it to overall flat products with a VOC content of 0-250 g/l.

Figure 2

Additionally, this data was further analyzed by assessing the volume of product sold for exterior and interior use. A total of 13,005,301 gallons of interior flat coatings was sold in 1996, as compared to 13,436,722 gallons of exterior coatings. Of



the total volume of interior coatings, 71% of the total volume was for flats with a VOC content between 0-100 g/l. In contrast, approximately 30% of the total volume of the exterior flats represented coatings with a VOC content between 0-100 g/l. Figure 4, below, represents this data in a graphical manner.

In summary, the CARB survey clearly shows the availability and use of flat coatings that meet the future 100 g/l VOC content limit. The District recognizes that a larger percentage of interior flats (both in terms of number of products and volume) that comply with the future limit were sold in 1996.

Figure 3

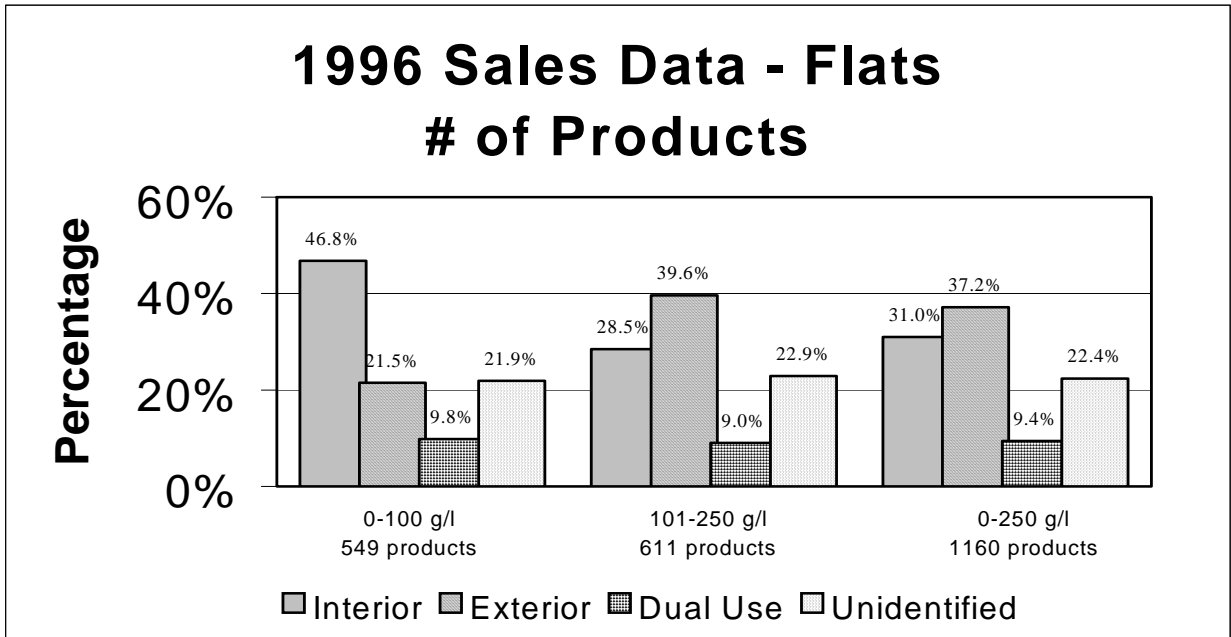
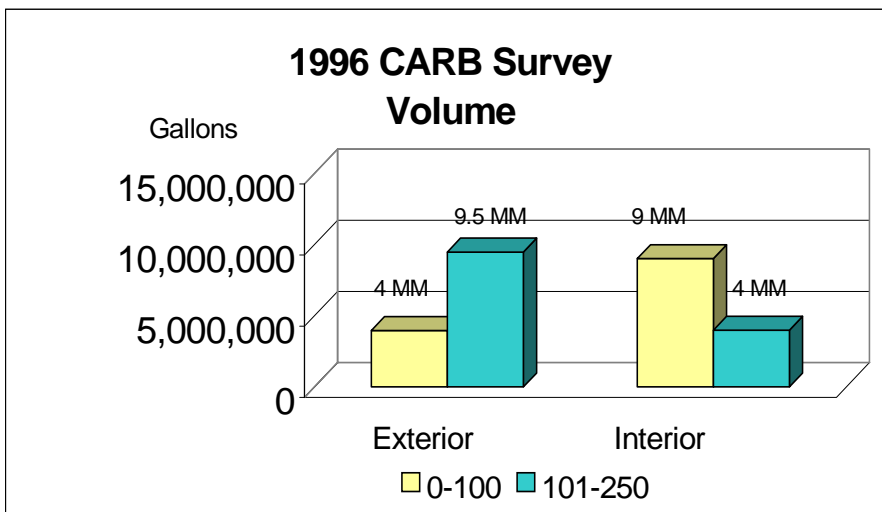


Figure 4



However, the CARB survey also shows the sale of almost 4,000,000 gallons of exterior flats that comply with the future VOC limit. The volume figures for low-VOC interior and exterior flats is significant and clearly demonstrates that the low-VOC formulations are technologically and commercially achievable and acceptable by the public.

Nonetheless, the Averaging Program included in the rule, also to be implemented in July 2001, would allow the manufacturers to average their emissions from sale of interior and exterior flat coatings.

MPI Data

In order to supplement the information extracted from the CARB survey, the District researched and contacted various groups that are working on developing performance standards for architectural coatings. One such group is Master Painters Institute[®] (MPI), founded in 1996. MPI, in conjunction with paint manufacturers and paint technologists, has developed universal performance-based standards. Additionally, MPI conducts all laboratory testing to assess the performance characteristics of the different paint categories. Products that meet the performance standards are included in the approved products list, which is made available via the internet or hardcopy. The approved products list is updated periodically, as manufacturers submit their paint samples for analyses. As of August 1999, 33 manufacturers had submitted their products, for possible inclusion into the approved list. MPI indicates that not all available products from all manufacturers are included in their analyses.

Recently, the U.S. Navy announced their intention to use MPI Product Standards and the approved products list for all of their architectural and industrial maintenance coatings use. The U.S. Air Force and General Services Administration are currently evaluating the universal performance based standards for inclusion into their coatings program.

Following a request by staff during a working group meeting in January 2000, Dunn Edwards suggested, in a letter dated January 28, 2000, that the flat coatings be evaluated using the current federal specifications for exterior and interior flat coatings. The current federal specification for exterior flat coatings is TT-P-19, entitled Paint, Acrylic Emulsion: Exterior and the current federal specification for interior flat coatings is TT-P-29, entitled Paint, Latex.

An evaluation of MPI's universal performance based standards indicates that MPI specifications are equivalent to the federal specifications discussed above. Specifically, MPI Specification Reference #10 is equivalent to Federal Specification TT-P-19 (exterior), which includes testing for gloss, consistency/viscosity, dry time, fineness of grind, hiding power, reflectance, flexibility, water resistance, and accelerated weathering. MPI Specification Reference #53 is equivalent to Federal Specification TT-P-29 (interior), which includes testing for gloss, consistency/viscosity, dry time, fineness of grind, hiding power by contrast ratio method, reflectance, flexibility, scrubability, alkali resistance, and sealing properties. MPI's Detailed Performance specifications for both interior and exterior flats are included as an attachment to this letter. It should be noted, however, that MPI does not conduct the VOC analysis, but records the VOC information as reported by the manufacturer.

Staff has also included the approved products list for interior and exterior flats, as of May 26, 2000. For interior flats, 19 products have met the standards for performance charac-

teristics summarized above. Of these 19, 8 products have a regulatory VOC content less than 101 g/l. This equates to 42% of the products tested. For exterior flats, a total of 26 products have met the standards, with 7 products (27%) having a regulatory VOC content of less than 101 g/l.

During the January 19, 2000 and May 17, 2000 working group meetings to discuss the assessment for flat coatings, staff requested industry to submit specific issues related to flat coatings with a VOC content at or below 100 g/l, as well as to identify specific problematic substrates and uses. To date, three comment letters have been received. All three letters indicate that the 100 g/l limit is not appropriate for all flat coating applications, but fail to discuss the specific substrates or uses where the use of compliant products may not be appropriate due to performance concerns. One of the three letters does suggest concern that flat coatings below 100 g/l may have a limited color-palette, shorter lap times, and other limited performance properties when compared to their higher-VOC counterparts.

Staff's technology assessment, as well as a review of product data sheets from various manufacturers, shows availability of a variety of flat coatings that have a VOC content of or less than 100 g/l. These flat coatings, including some zero-VOC flat coatings, have a full range of colors and scrub resistance equal to or greater than their higher-VOC counterparts. Additionally, as discussed above, MPI's specifications include testing for scrub resistance and hiding power. Overall, the commentators failed to provide any specific information or any empirical data to refute the availability and acceptance of the lower-VOC flat coatings.

This data clearly shows availability of flat coatings, both interior and exterior, that meet or exceed the performance standards established by paint manufacturers, paint technologists, and end-users.

In conclusion, based on the CARB survey data and the laboratory analyses by MPI, staff recommends maintaining the 100 g/l for flat coatings, effective July 1, 2000.

Future Assessments

Staff will shortly initiate the technology assessment to be conducted for other categories, to be presented to the Board in July 2001. Staff will work with the Working Group and the TAC to determine the scope of the study, and will include a thorough product-availability assessment, a review of the NTS Study results, continued efforts in evaluating data generated by MPI, as well as additional laboratory evaluation, as necessary.

Attachments

MPI 10 – Performance Standard for Exterior Latex White and Tints

MPI Performance Standard for

Exterior Flat Latex White and Tints

1. Scope

- 1.1 This standard is for a white or colored, flat, latex based paint, intended for use on new and previously painted exterior wall surfaces. This product is not intended for application to un-primed wood surfaces where extractive bleeding may be anticipated.
- 1.2 For recommended substrates see paragraph 6.
- 1.3 The tests specified in this standard may involve the use of materials or equipment that in their storage, handling, use, or disposal may pose a danger to the environment and/or testing personnel. Conformance to the pertinent national and regional safety and environmental requirements is the responsibility of the user of this document

2. Toxic Elements

- 2.1 This paint will be manufactured to conform to the current Federal, State and municipal safety and environmental regulations in regards to toxic elements.

3. References

- 3.1 American Society for Testing- Materials (ASTM) Volumes 6.01,6.02, 6.03, 6.04
- 3.2 MPI Architectural Specification Manual
- 3.3 MPI Maintenance and Repainting Guide

4. Requirements

4.1 The paint shall be suitable for application by brush, roller and spray equipment. If thinning is required, the manufacturer will display information about the recommended amounts in the directions for application. The paint shall be capable of curing at temperatures between 50° F (10° C) and 104° F(40° C.) and a relative humidity range of 30 - 80%. The manufacturer shall certify that this product-is designed to, or contains chemical compounds that, inhibit the growth of mildew in all but severe environments.

	<u>Test Name</u>	<u>Min.</u>	<u>Max.</u>	<u>Test method</u> ASTM
4.2	Consistency, Kneb Units	80	--	D 562
4.3	Dry time, Dry hard	--	2 hr	D 1640
4.4	Fineness of Grind, Hegman	2	--	D1210
4.5	Gloss 60 degree	--	5	Para 7.11
4.6	Sheen 85 degree	--	10	Para 7.11
4.7	<u>Hiding Power</u>			

A dried film of the untinted white paint when applied and tested according to the requirements of paragraph 7.9, shall have a contrast ratio of 98 or higher. Reference ASTM D 2805.

4.7.1 Reflectance

The average reflectance of a dried film of the white paint shall not be less than 90% when prepared and tested according to the requirements of paragraph 7.10.

4.8 Alkali Resistance

A dried film of the paint shall show no signs of lifting, wrinkling, disintegration or more than a slight color change when prepared and tested in accordance with the requirements of Paragraph 7.2.

4.9 Scrubbability

The dried film will withstand 2500 scrub cycles without showing any breakthrough of the film and only a slight difference in appearance between the scrubbed and un-scrubbed areas of the panel when prepared and tested in accordance with the requirements of Paragraph 7.3.

4.10 Package Stability

The paint shall not thicken, skin or show any coarse particles when stored at temperatures between 40 and 104° F (5 and 40° C) in unopened containers for 12 months. After 12 months the paint shall show no hard setting and shall be readily stirrable and shall meet the requirements for grind, dry time and applicability.

4.11 Applicability and Appearance

When applied by brush and roller as described in Paragraph 7.4, the paint shall meet the following requirements:

- 4.11.1 It shall have suitable consistency for good brushing and rolling properties and shall be free of coarse particles and sagging.
- 4.11.2 There shall be no objectionable odor and it shall have a suitable re-coating and dry time. There shall be no lifting, wrinkling, lack of uniformity nor other film defects.
- 4.11.3 There shall be no difference in color or gloss between the brushed and rolled sections of the panel. There will be a minimum of foam developed during the roller application. If foam is evident there shall be no cratering or bubbles visible from a distance of 0.5 meters in the dry film.
- 4.11.4 The dried finish coat shall be uniform in color, appearance and sheen. There shall be no flashing, or ghosting. There will be good flow and leveling properties indicated by the absence of significant brush marks or roller stipple in the dry film. The grey stripe shall only be slightly visible under the one coat area and shall not be visible under the two coat area.

4.12 Sealing Properties

The paint, when prepared and tested as specified in paragraph 7.5, shall not show a difference greater than 7% between the sealed and unsealed areas of the chart.

4.13 Early Water Resistance

The paint, when prepared and tested as specified in paragraph 7.6, shall show no evidence of washing off the panel, lifting or wrinkling, after a continuous 5 minute exposure to the spray.

4.14 Accelerated Weathering

The paint, when prepared and tested in accordance with paragraph 7.7 and ASTM G 53 and exposed for 500 hours, shall show no blistering, chalking, checking, cracking, flaking or loss of adhesion. There shall be only a minimal color change when the exposed panels are compared with the unexposed panel.

4.15 Flexibility

The dried film, when prepared and tested in accordance with paragraph 7.8, shall show no cracking, peeling or loss of adhesion when subjected to the mandrel test, using a 1/4" mandrel.

5. Quality Assurance

5.1 Records

It will be the manufacturer's responsibility to keep retained samples of each batch of qualified product for a minimum of two years. Quality control records of qualified products must be maintained for a minimum of three years.

5.2 Formulation Changes

To maintain the product listing in the MPI Architectural Painting Specification Manual and the MPI Maintenance Repainting Manual, the manufacturer of a qualified product must notify, in writing, the MPI Testing Authority of:

a) Any changes to the paint formula in regard to types of materials, or ratios of materials, that may significantly alter the performance of the finished product or limit its use as specified in the MPI manuals. A testing report that confirms the product continues to meet the requirements of the standard will be required for evaluation.

b) Any changes to the code number, label or line name, so that the listing in the manuals can be updated.

6 Intended Uses

6.1 The paint complying with this specification is intended for use on new or previously painted, exterior surfaces including, stucco, concrete or primed wood surfaces. This material is not intended for use on new woods prone to extractive bleeding (i.e. cedar) unless a stain blocking primer is applied first.

6.2 Hard, glossy, previously painted surfaces should be dulled by sanding, and primed with an appropriate primer, prior to the application of this paint. Surfaces with repairs or other areas of varied porosity shall be primed with a qualified primer.

6.3 For details on uses, systems and surface preparation, refer to the MPI Architectural Painting Specification Manual, or the MPI Maintenance Repainting Manual.

7 Testing Details

7.1 General

Sample preparations for the following tests shall be carried out in an well ventilated room, free from dust, direct drafts, combustive gasses and laboratory fumes. Maintain the temperature at 70 - 77° F (23 +/- 2° C) and humidity at 50 +/- 5% for the duration of the specified curing time. The paint dry film thickness shall be 2.0 mils unless otherwise specified in the test method. (Ref. ASTM D 3924).

7.2 Alkali Resistance

Apply a film of the paint by use of a draw-bar with a 7 mil gap (note 1) to a Leneta plastic scrub panel (Form P-121-10N). Allow to cure 48 hours under the conditions specified in paragraph 7.1. At the end of the curing period apply a solution of 2% sodium hydroxide in distilled water to a small area of the panel and cover with a watch glass. After two hours, remove the watch glass and examine the film for signs of disintegration or deterioration. Dry the panel by damping lightly with an absorbent cloth and examine the film for any lifting, wrinkling or other defects.

7.3 Scrubbability

Apply a film of the paint by draw-bar to a black plastic panel (Leneta Panels form P-121-10N) using a 7 mil draw-bar (note 1) and allow to cure 7 days under the conditions specified in Paragraph 7.1. ASTM method D 2486 will be used with the following exceptions:

a) There shall be no shim applied to the back of the panel.

b) The scrub medium shall be a 2% nonyl phenoxy ethanol, non-ionic detergent in water applied drop-wise from a burette to the surface under test at a rate of 8 to 10 drops per minute.

c) The test will be performed continuously, without interruption, and without the addition of extra solution or water, to the conclusion of the specified number of cycles.

7.4 Applicability and Appearance

Prepare a wallboard sample 48 inches by 48 inches by taping the exposed edges. Using a roller, apply a coat of MPI primer-sealer or a qualified CAN/CGSB 1.119M latex sealer to the entire face of the panel and allow to dry for a minimum of 4 hours. Apply a 6 inch stripe of latex primer-sealer tinted to a gray with a reflectance of 50 +/- 3% through the horizontal center of the panel. Allow to dry a minimum of four hours, (for convenience, panels can be prepared in advance and stored in a clean, dry area.).

Cut-in a coat of the test paint by brush to the face of the board from the edges inward 4 inches, feathering the edges with light brush strokes. Note the brush handling and leveling. Using a roller, apply a coat of the paint under test to the center of the panel leaving approximately 3 inches from the edge. Allow three hours dry then examine the film and note any dis-uniformity at the laps, color and any foam or craters. Apply a second coat of paint by roller to one vertical half of the panel.

After 24 hours dry evaluate the panel for appearance and hiding. Application and curing should be conducted in conditions as specified in paragraph 7.1. The grey stripe should not be visible under the two coat area-and only slightly visible under the one coat area.

7.5 Sealing Properties

Tint a 250 ml container of the paint under test with a lampblack colorant to a reflectance of 60%. Apply to the sealed and unsealed portions of a Penopac chart by using a 7 mil (note 1) draw-bar. Allow to dry 7 days under the conditions specified in paragraph 7.1. Measure the reflectance over the sealed and unsealed areas of the chart using ASTM method E-97.

7.6 Early Water Resistance

Prepare three White pine panels (ASTM D 358) by applying an alkyd wood primer to all sides of the panel and allow to dry a minimum of 48 hours. (Note: panels may be prepared in advance and stored for later use, but in no case, shall panels that have been stored for longer than two months be used). Apply a coat of the test paint, by brush, to the face of each of the panels, at a spreading rate of 350 sq. ft. per gallon and allow to dry 4 hours under the conditions specified in paragraph 7.1.

At the end of 4 hours, expose the panels to a continuous water fog, produced by 4 no. 40 Atlas spray nozzles. The spray nozzles shall be 2 ft. above the panels, and shall produce a light drizzle. The water flow shall be approximately 1 gallon per hour. The panels shall be placed at a 60° to the horizontal plane and centered beneath the spray nozzle. Immediately after exposure, examine the panels for any signs of blistering, lifting, wrinkling, or washing off the panel.

7.7 Accelerated Weathering

Prepare three White pine panels (ASTM D 358) by applying an alkyd wood primer at a spreading rate of 350 sq. ft. per gallon and allow to dry. (Note: panels may be prepared in advance and stored for later use, but in no case, shall panels that have been stored for longer than two months be used). Apply a coat of the test paint, by brush, to each of the panels, at a spreading rate of 350 sq. ft. per gallon and allow to dry 24 hours. Apply a second coat at the same spreading rate, and allow to dry under standard conditions for 7 days. Expose two of the panels in an UV condensation weathering machine conforming to the requirements of ASTM G-53. The cycle will consist of 4 hours of UV exposure at 60° C; and 4 hours condensation exposure at 40 C. At the end of the test period, evaluate the panels for gloss change, chalking (ASTM D 659), blistering (ASTM D 714), cracking (ASTM D 661) and checking (ASTM D 660). Compare the color of the exposed panels to the retained panel.

7.8 Flexibility

Apply by use of a draw-bar with an 8 mil gap, a film of the coating under test to clean aluminum panels (Note

2). Allow to dry for 14 days under the conditions specified in paragraph 7.1. Test in accordance with ASTM D 1737. Immediately after the bending test, examine the film for cracking, flaking or any loss of adhesion, using a 10X magnifying glass.

7.9 Hiding Power

Apply a film of paint to a Leneta form 2c application chart using a 7 mil draw-bar (note 1). Allow to cure for 7 days Under the conditions specified in Paragraph 7.1. Measure the reflectance over the black and white areas of the chart with a Byk Gardner color guide spectrophotometer or equivalent instrument and determine the contrast ratio.

7.10 Reflectance

Apply a film of paint to a Leneta form WB plain white application chart using a 7 mil draw-bar (note 1). Allow to Cure for 7 days under the conditions specified in Paragraph 7.1. Measure the reflectance with a Byk Gardner color guide spectrophotometer or equivalent instrument.

7.11 Gloss/Sheen

Apply a film of paint to a Leneta form WB plain white application chart using a 7 mil draw-bar (note 1). Allow to cure for 7 days under the conditions specified in Paragraph 7.1. Measure the gloss and sheen using a Byk Gardner Micro-Tri-gloss multi angle glossmeter or equivalent instrument.

Notes

- 1 The Dow film caster, available from Byk Gardner or Paul N. Gardner Inc meets this requirement.
- 2 Aluminum panels shall be 1/32 inch (22 gage) and prepared by first solvent cleaning (ASTM D 1730 method A) then by hand or mechanical abrasion (ASTM D 1730 method D) using a 150 grit emery paper.

8 Labeling

8.1 Each container shall be labeled to show:

- i) The name of the material
- ii) The manufacturer's address
- iii) The manufacturer's batch number and product code number
- iv) The date of manufacture or package
- v) The color number
- vi) Application and thinning instructions
- vii) Storage requirements
- viii) MPI standard and code number for listing
- ix) Any required safety information required by Federal, State or Provincial safety authority

9 Call-up Testing and Listing Requirements

- 9.1 Before initial qualification and approval for listing, products shall be tested to assure compliance with the specified requirements of the standard. Manufacturers shall assure this in a test report accompanied by an affidavit and this will be kept on file in the MPI office. These records will be kept on file until the next listing is printed.

MPI 53 – Performance Standard for Interior Flat Latex White and Tints

MPI Performance Standard for

Interior Flat Latex White and Tints

1 Scope

- 1.1 This standard is for a white or colored, flat, latex based paint, intended for use on new and previously painted, interior wall surfaces in residential and commercial environments.
- 1.2 For recommended substrates see paragraph 6.
- 1.3 The tests specified in this standard may involve the use of materials or equipment that in their storage, handling, use, or disposal may pose a danger to the environment and/or testing personnel. Conformance to the pertinent national and regional safety and environmental requirements is the responsibility of the user of this document

2 Toxic Elements

- 2.1 This paint will be manufactured to conform to the current Federal, State and municipal safety and environmental regulations in regards to content or restrictions of toxic elements.

3 References

- 3.1 American Society for Testing- Materials (ASTM) Volumes 6.01,6.02, 6.03, 6.04
- 3.2 MPI Architectural Painting Specification Manual
- 3.3 MPI Maintenance and Repainting Guide

4 Requirements

4.1 The paint shall be suitable for application by brush, roller and spray equipment. If thinning is required, the manufacturer will display information about the recommended amounts in the directions for application. The paint shall be capable of curing at temperatures between 50° F (10° C) and 104° F(40° C.) and a relative humidity of 30 - 80%.

	<u>Test Name</u>	<u>Min.</u>	<u>Max.</u>	<u>Test method</u> ASTM
4.2	Consistency, Krieb Units	80	--	D 562
4.3	Dry time, Dry hard	--	2 hr	D 1640
4.4	Fineness of Grind, Hegman	3	--	D1210
4.5	Gloss 60 degree	--	5	Para 7.9
4.6	Sheen 85-degree	--	10	Para 7.9
4.7	<u>Hiding Power</u>			

A dried film of the untinted white paint when applied and tested according to the requirements of paragraph 7.7, shall have a contrast ratio of 98 or higher. Reference ASTM D 2805.

4.7.1 Reflectance

The average reflectance of a dried film of the untinted white paint shall not be less than 92% when prepared and tested according to the requirements of paragraph 7.8.

4.8 Alkali Resistance

A dried film of the paint shall show no signs of lifting, wrinkling, disintegration or more than a slight color change when prepared and tested in accordance with the requirements of Paragraph 7.2.

4.9 Scrubbability

The dried film will withstand 1000 scrub cycles without showing any breakthrough of the film, and only a slight difference in appearance between the scrubbed and un-scrubbed areas of the panel and a maximum of 100% or 4 units (whichever is the lesser) change in 85 degree sheen compared to initial sheen, measured just prior to the test when prepared and tested in accordance with the requirements of Paragraph 7.3.

4.10 Package Stability

The paint shall not thicken, skin or show any coarse particles when stored at temperatures between 40 and 104° F (5 and 40° C) in unopened containers for 12 months. After 12 months the paint shall show no hard setting and shall be readily stirrable and shall meet the requirements for grind, dry time and applicability.

4.11 Applicability and Appearance

When applied by brush and roller as described in Paragraph 7.4, the paint shall meet the following requirements:

- 4.11.1 It shall have suitable consistency for good brushing and rolling properties and shall be free of coarse particles and sagging.
- 4.11.2 There shall be no objectionable odor and it shall have a suitable re-coating and dry time. There shall be no lifting, wrinkling, lack of uniformity or other film defects.
- 4.11.3 There shall be no difference in color or gloss between the brushed and rolled sections of the panel. There will be a minimum of foam developed during the roller application. If foam is evident there shall be no cratering or bubbles visible from a distance of 0.5 meters in the dry film.
- 4.11.4 The dried finish coat shall be uniform in color, appearance and sheen. There shall be no flashing, or ghosting. There will be good flow and leveling properties indicated by the absence of significant brush marks or roller stipple in the dry film. The gray stripe shall only be slightly visible under the one coat area and shall not be visible under the two coat area.

4.12 Sealing Properties

The paint, when prepared and tested as specified in paragraph 7.5, shall not show difference greater than 7% between the sealed and unsealed areas of the chart.

4.13 Flexibility

The dried film, when prepared and tested in accordance with paragraph 7.6, shall show no cracking, peeling or loss of adhesion when subjected to the mandrel test, using a 1/4" mandrel

5 Quality Assurance

5.1 Records

It will be the manufacturer's responsibility to keep retained samples of each batch of qualified product for a minimum of two years. Quality control records of qualified products must be maintained for a minimum of three years.

5.2 Formulation Changes

To maintain the product listing in the MPI Architectural Painting Specification Manual and the MPI Maintenance Repainting Guide, the manufacturer of a qualified product must notify, in writing, the MPI Testing Authority of:

- a) Any changes to the paint formula in regard to types of materials, or ratios of materials, that may significantly alter the performance of the finished product or limit it's use as specified in the MPI manuals.

A testing report that confirms the product continues to meet the requirements of the standard will be required for evaluation.

- b) Any changes to the code number, label or line name, so that the listing in the manuals can be updated.

6 **Intended Uses**

- 6.1 The paint complying with this specification is intended for use on new or previously painted, interior wall and ceiling surfaces including, gypsum wallboard, plaster, concrete or primed wood surfaces. This material is not intended for use on new woods prone to extractive bleeding (i.e. cedar) unless a stain blocking primer is applied first.
- 6.2 Glossy, previously painted surfaces should be dulled by sanding, and primed with an appropriate primer, prior to the application of this paint. Surfaces with repairs or other areas of varied porosity shall be primed with a qualified primer-sealer.
- 6.3 For details on uses, systems and surface preparation, refer to the MPI Architectural Painting Specification Manual, or the MPI Maintenance Repainting Guide.

7 **Testing Details**

7.1 **General**

Sample preparations for the following tests shall be carried out in an well ventilated room, free from dust, direct drafts, combustive gasses and laboratory fumes. Maintain the temperature at 70 - 77° F (23 +/- 2° C) and humidity at 50 +/- 5% for the duration of the specified curing time. The paint dry film thickness shall be 2.0 mils unless otherwise specified in the test method. (Ref. ASTM D 3924).

7.2 **Alkali Resistance**

Apply a film of the paint by use of a 7 mil draw-bar (note 1) to a Leneta plastic scrub panel (form P-121-10N). Allow to cure 48 hours under the conditions specified in paragraph 7.1. At the end of the curing period apply a solution of 2% sodium hydroxide in distilled water to a small area of the panel and cover with a watch glass. After 30 minutes, remove the watch glass and examine the film for signs of disintegration or deterioration. Dry the panel by damping lightly with an absorbent cloth and examine the film for any lifting, wrinkling or other defects.

7.3 **Scrubability**

Apply a film of the paint to a black plastic panel (Leneta Panels form P-121-10N) using a 7 mil draw-bar (note1) and allow to cure 7 days under the conditions specified in Paragraph 7.1. ASTM method D 2486 will be used with the following exceptions:

- a) There shall be no shim applied to the back of the panel.
- b) The scrub medium shall be a 2% nonyl phenoxy ethanol, non-ionic detergent in water applied drop-wise from a burette to the surface under test at a rate of 8 to 10 drops per minute.
- c) The test will be performed continuously, without interruption, and without the addition of extra solution or water, to the conclusion of the specified number of cycles.

7.4 **Applicability and Appearance**

Prepare a wallboard sample 48 inches by 48 inches by taping the exposed edges. Using a 15mm pile synthetic roller, apply a coat of MPI primer-sealer or a qualified CAN/CGSB 1.119M latex sealer to the entire face of

the panel and allow to dry for a minimum of 4 hours. Apply a 6 inch stripe of latex primer-sealer tinted to a gray with a reflectance of 50 +/- 3% through the horizontal center of the panel. Allow to dry a minimum of four hours, (for convenience, panels can be prepared in advance and stored in a clean, dry area.).

Cut-in a coat of the test paint by brush to the face of the board from the edges inward 4 inches, feathering the edges with light brush strokes. Note the brush handling and leveling. Using a roller, apply a coat of the paint under test to the center of the panel leaving approximately 3 inches from the edge. Allow three hours dry then examine the film and note any dis-uniformity at the laps, color and any foam or craters. Apply a second coat of paint by roller to one vertical half of the panel.

After 24 hours dry evaluate the panel for appearance and hiding. Application and curing should be conducted in conditions as specified in paragraph 7.1. The gray stripe should not be visible under the two coat area and only slightly visible under the one coat area.

7.5 Sealing Properties

Tint a 250 ml container of the paint under test with a lampblack colorant to a reflectance of 60%. Apply to the sealed and unsealed portions of a Penopac chart by using a 7 mil (note 1) draw-bar. Allow to dry 7 days under the conditions specified in paragraph 7.1. Measure the reflectance over the sealed and unsealed areas of the chart using ASTM method E-97.

7.6 Flexibility

Apply by use of a draw-bar with an 8 mil gap, a film of the coating under test to clean aluminum panels (Note 2). Allow to dry for 14 days under the conditions specified in paragraph 7.1. Test in accordance with ASTM D 1737. Immediately after the bending test, examine the film for cracking, flaking or any loss of adhesion, using a 10X magnifying glass.

7.7 Hiding Power

Apply a film of paint to a Leneta form 2c application chart using a 7 mil draw-bar (note 1). Allow to cure for 7 days Under the conditions specified in Paragraph 7.1. Measure the reflectance over the black and white areas of the chart with a Byk Gardner color guide spectrophotometer or equivalent instrument and determine the contrast ratio.

7.8 Reflectance

Apply a film of paint to a Leneta form WB plain white application chart using a 7 mil draw-bar (note 1). Allow to Cure for 7 days under the conditions specified in Paragraph 7.1. Measure the reflectance with a Byk Gardner color guide spectrophotometer or equivalent instrument.

7.9 Gloss/Sheen

Apply a film of paint to a Leneta form WB plain white application chart using a 7 mil draw-bar (note 1). Allow to cure for 7 days under the conditions specified in Paragraph 7.1. Measure the gloss and sheen using a Byk Gardner Micro-Tri-gloss multi angle glossmeter or equivalent instrument.

Notes

- I** **The Dow film caster, available from Byk Gardner or Paul N. Gardner Co. Inc. meets this requirement.**
- 2** **Aluminum panels shall be 1/32 inch (22 gage) and prepared by first solvent cleaning (ASTM D 1730 method A) then by hand or mechanical abrasion (ASTM D 1730 method D) using a 150 grit emery paper.**

8 **Labeling**

8.1 Each container shall be labeled to show:

- i) The name of the material
- ii) The manufacturer's address
- iii) The manufacturer's batch number and product code number
- iv) The date of manufacture or package
- x) The color number
- xi) Application and thinning instructions
- xii) Storage requirements
- xiii) MPI standard and code number for listing
- xiv) Any safety information required by Federal, State or Provincial safety authority

9 **Call-up Testing and Listing Requirements**

- 9.1 Before initial qualification and approval for listing, products shall be tested to assure compliance with the specified requirements of the standard. Manufacturers shall assure this in a test report accompanied by an affidavit and this will be kept on file in the MPI office. These records will be kept on file until the next listing is printed.

Approved Product List – MPI #53 – Interior Latex, Flat



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Approved Product List**

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MPI #53 - Interior Latex, Flat

A white, or colored, waterborne latex paint with a flat finish. Used on primed/sealed interior wall surfaces such as plaster, gypsum and on primed wood and metal. Not intended for use on unprimed wood surfaces.

[Gloss must be a maximum 5 units @ 60 degrees and sheen a maximum of 10 units at 85 degrees. Other evaluated characteristics include consistency/viscosity, dry time, fineness of grind, hiding power by contrast ratio method, reflectance, flexibility, scrubability, alkali resistance and sealing properties. See MPI 'Detailed Performance' Specs for complete details, specific requirements, and/or reference specs.]

MPI VOC Ranges (g/L) <101 = 101-200 = 201-250 = Blanks may indicate no information available

Listing Brand	Label	Product Name	Code	VOCs
California Paints ²	Pacific	Latex Flat	560XX-Series	
Cloverdale Paint		Interior Acrylic Flat Latex	031 Series	
Color Wheel ²	Contractor's Choice	Hi-Hide Int/Ext Wall Paint	200	
Color Your World	Designer's Touch	Int. Flat Latex	6800	
Columbia Paint ²	Professional	Interior Latex Flat	02-737-WB	
Coronado Paint	Premium Gold Collection	Acrylic Flat Latex	26 Line	
Davis-Frost ²	Davis Paint	ProMax Interior Latex	3000 Series	
Farrell-Calhoun ²		Interior Premium Flat Latex Wall Paint	300 Line	
Flex Bon Paints		Interior Flat Acrylic Wall Paint	45-1	
Frazee ²		Velvin	011	
General Paint ²	Breeze	Interior Flat Latex	52-010* Line	
Glidden	Ultra	Int. Flat Latex	94500*	
Hirshfield's Paint	ProWall 1000	Wash & Wear	1090	
ICI Dulux	Dulux Professional	Interior Latex Flat	1200 Series	
Kelly-Moore		Super Latex Interior Flat Wall Paint	550	
Monarch ²		High Performance Flat Wall Finish	6100	
Northern Paint	Colorlox	Int. Latex Flat White	42-11*	
PPG	Speedhide	Interior Latex Flat	6-70	
Spectra-Tone ²	Gold Label Premium	Superwall Latex Flat	418	

Approved Product List – MPI #10 – Exterior Latex, Flat



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Approved Product List**

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MPI #10 - Exterior Latex, Flat

A white or colored, flat, waterborne paint intended for use on new and previously painted exterior wall surfaces, including stucco, concrete, or primed wood. This product is not intended for application to un-primed wood surfaces prone to extractive bleeding (i.e. cedar/redwood) unless a stain blocking primer is first applied.

[Gloss must be a maximum of 5 units @ 60 degrees and sheen a maximum of 10 units at 85 degrees. Other evaluated characteristics include consistency/viscosity, dry time, fineness of grind, hiding power, reflectance, flexibility, water resistance and accelerated weathering. See MPI 'Detailed Performance' Specs for complete details, specific requirements, and/or reference specs.]

MPI VOC Ranges (g/L) <101 = 101-200 = 201-250 = Blanks may indicate no information available

Listing Brand Label	Product Name	Code	VOCs
Benjamin Moore	Mooregard Latex Exterior	103*	
California Paints ²	2010 House Paint Exterior Velvet Flat 100% Acrylic Latex	400XX-Series	
Cloverdale Paint	Exterior Acrylic Flat Latex	020 Series	
Color Wheel ²	Contractor's Choice Tropicoat House Paint	310	
Color Your World	Outsider Ext. Latex Flat	5900	
Columbia Paint ²	High Performance Exterior 100% Acrylic Latex	01-235-Series	
Coronado Paint	Premium Gold Collection Acrylic One Coat Flat House Paint	10 Line	
Davis-Frost ²	Davis Paint Flat House Paint	300 Series	
Farrell-Calhoun ²	Exterior 100% Acrylic Latex Flat	200 Line	
Flex Bon Paints	Exterior Flat 100% Acrylic House Paint	10-1	
Frazee ²	Duratec II	203	
General Paint ²	Breeze Exterior Flat Latex	70-010* Line	
Glidden	Ultra Exterior Latex Flat	94100*	
Hirshfield's Paint	Housecoat Exterior Acrylic Latex	4290	
ICI Dulux	Dulux Exterior Latex Flat	2201 Series	
Kelly-Moore	Acry-Shield Exterior Flat Acrylic Finish	1240	

Mills Paint	Superior Quality	Exterior Low Lustre Acrylic Latex	120	▲▲
Monarch ²	Premier	Aqua-Gleem 100% Acrylic Flat Exterior House & Trim Paint	2600	▲▲
Northern Paint	Timberlox	Ext. Covercoat Flat Acrylic Latex	53 Line*	▲▲
Para Paints	Ultra	Exterior Latex Flat	7000*	▲▲▲
Porter Paints	Acri-Pro 100 Flat	Exterior Alkyd Paint	930	▲▲▲
PPG	Sunproof	Exterior Latex Flat	72 Line	▲▲▲
Sherwin Williams	A-100	Latex House & Trim Satin	A82 Series	▲▲
Sico Coatings	Sico Expert	Exterior Acrylic Latex	971 Series	
Spectra-Tone ²	Gold Label Premium	Matte Gold 100% Acrylic House Paint	650	▲▲
Tower Paint		Acrylic Flat Latex	379 Series	▲▲