

Development of a Performance and Environmental Certification System for Recycled Paint Products

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The outcome of a project establishing a Recycled Paint Certification System and industry-wide standard for recycled latex paint ensuring performance equal to virgin paint with respect to product quality, as well as environmental integrity, is presented. This project has long-term goals of increasing the sale of latex-based Recycled Content Paint (RCP), increasing the purchase of leftover paint from the governmental Hazardous Household Waste Program by RCP producers, and reducing the cost to local government for managing leftover latex paint. In addition, the Certification System is expected to increase the purchase of RCP by government agencies, painting contractors, and homeowners throughout the U.S. The Certification System was developed through the collaboration of several key federal, state, and local agencies, organizations, virgin paint manufacturers, and recycled paint manufacturers. A conservative estimate developed by the Product Stewardship Institute, the project coordinator, determined that there are 3.1 million gallons of leftover consumer paint per year in the U.S. If all leftover consumer paint in the U.S. had to be collected and managed by municipalities as waste, the costs are estimated to be over \$275 million per year. The project was funded by the California Integrated Waste Management Board, Dunn-Edwards Paint Company, and Portland Metro Regional Government.

INTRODUCTION

Look in most home basements, garages, tool sheds, and storage buildings and you will find a common item—leftover paint. Consumers often have no further need for it, trash haulers will not accept it unless it is dried, and local governments are left with trying to come up with an answer when asked, "What should I do with my leftover paint?" End-of-life management of left-

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over paint has become an increasingly costly line item in local government budgets in a time of shrinking state and local revenues. Dissatisfied with the current lack of cost-effective solutions, many of those involved in paint management have expressed interest in working together to jointly solve this problem.

In December 2003, the Product Stewardship Institute (PSI) convened the National Paint Product Stewardship Initiative (PPSI) and brought together representatives from the paint industry, industry associations, retailers, state and local government, environmental/consumer advocates, paint recyclers, and others, to develop a strategy for solving problems related to leftover paint management. PSI estimated the cost to manage leftover paint on a national level to be over \$275 million per year. Participants in this dialogue agreed to implement 11 projects, at a cost of \$1.2 million, which would provide information necessary for the development of a nationally coordinated leftover paint management system. One of the projects was the development of a performance and environmental certification system for recycled paint products.

Water-based (latex) paints make up the majority of recyclable leftover paint products. Although solvent-based paints are still used and sold, they present unique challenges for recycling. The standard described in this article will pertain only to water-based latex paints.

The best option for leftover paint is to recycle it. Since 65% of leftover paint is of such a quality that it can be reused or recycled, the goal is to maximize reuse to keep costs down and to maximize the production of recycled paint, which would help create a demand for leftover paint. Local governments are looking for an outlet for leftover paint that will use the non-renewable resources in paint such as titanium dioxide.

In order to maximize production of recycled content paint (RCP) products, there must be willing buyers. Potential markets for RCP include all levels of government, contractors, retailers, and do-it-yourself (DIY) consumers. Increased government procurement of RCP will drive the rest of the market because government already has mandates to buy it. However, government purchases are currently on the decline, which does not send a good market signal as to the value of the paint. Additionally, since government hires contractors, if contractors are required to use RCP on government projects, it will broaden the acceptance of the paint. What follows is an explanation of the current barriers to the market expansion of RCP.

In 2000, about 637 million gallons of paint were sold in the United States, equal to approximately 2.3 gallons per person. Not all of the unused paint that is left over can be recycled. Some paint is hardened, con-

taminated, or has been otherwise rendered unusable due to freezing, bacteria, and other factors. PSI estimates that 65% of leftover paint is usable as recycled paint; therefore, nationally about 18.2 million gallons are available for recycling.

Market Barriers

As identified in the PSI Technical Background Report (found on the PSI website at www.productstewardship.us/prod_paint_nat_dia.html), barriers to market expansion of RCP include general negative perceptions regarding RCP quality, the lack of color selection, difficulty in color matching, and limited availability of specific finishes (e.g., low luster, gloss). Other barriers include consumers' fear that the leftover paint could be contaminated with hazardous materials, and concerns by manufacturers regarding liability and the threat that expanding recycled paint production might negatively impact sales of virgin products.

Some paint manufacturers, however, have concerns regarding product liabilities associated with selling RCP, specifically in the area of hazards assessment and ingredients disclosure on material safety data sheets and labels as required by law. These manufacturers believe that there are no assurances of the recycled paint content. They assert that, without identification of chemical identity, manufacturers of recycled paint cannot provide consumers or their employees with accurate information on the product material safety data sheets, product data sheets, and product labels. Therefore, they believe that it is impossible to provide proper, compliant hazard communication, and that users may not properly use recycled paint, protect themselves against unnecessary exposure, or ensure proper end-of-life management.

To illustrate the point, one virgin paint manufacturer articulated the following potential scenario about which they were concerned:

A consumer could become concerned about exposure of their child and/or other family members to recycled paint and call the recycled paint company's emergency response resource. The company would not be able to definitively tell the consumer what was in their can of paint or about any accompanying hazards associated with those constituents. In the event of a civil suit, the manufacturer could not definitively tell what was in their paint. Regardless of whether the paint is safe or not, this virgin paint manufacturer believes that this uncertainty could be sufficient enough to expose the manufacturer to financial damages. Out of concern for the paint industry as a whole (including the budding U.S. and Canadian paint recycling industry), some paint manufacturers that have these liability concerns disapprove of paint recycling even by other

companies because they believe that a single high-profile incident could damage the entire industry.

In addition to easing industry concerns regarding liability about selling a recycled product, the Recycled Paint Certification project was designed to address the most significant market barriers for government, contractors, and consumer purchase of recycled paint: quality and safety. The concern over lack of color selection and color matching has already been addressed by making recycled paint in a wider variety of colors. The public perception may still be that it is not available in a wide variety of colors, but it is. However, the main concerns of quality and safety remain, which is why even with broader color selection, the purchase of RCP is going down. In California, the RCP purchases over recent years have decreased by 50%, as described later in this article.

Manufacturers of Recycled Content Paint

Manufacturers of recycled content paint obviously play an important role in developing products that use leftover paint. Through their marketing efforts, manufacturers of recycled paint educate consumers about the benefits that these products offer in terms of lower environmental impacts and, in many cases, lower costs.

Several recycled paint producers/distributors were active in the dialog and participated in the Markets Workgroup. These companies expressed great concern over the lack of market demand for their product, particularly by state agencies, which are required to purchase it, as described in the next section. They argued that, if the state agencies that have a mandate to purchase recycled paint do not buy it due to concerns over paint quality and environmental, health, and safety concerns, the market will be doomed to fail. Some manufacturers reported a significant drop in recycled paint sales over the last two years and have thus stopped accepting leftover paint from county HHW facilities.

California Procurement of Recycled Paint

The California Public Contract Code (section 12170) requires state agencies to purchase recycled paint con-

taining at least 50% post-consumer content. The California Department of General Services has awarded a statewide contract for purchasing recycled latex paint by state agencies and any local government body or corporation empowered to expend public funds. Even with the state buy-recycled requirement and having a purchasing contract in place, California state purchase of RCP has dropped by 50% between FY 00/01 and FY 03/04, as demonstrated in Table 1.

The Department of General Services staff participating in the dialog stated that if RCP could demonstrate it could perform as well as virgin paint, the state would be more inclined to buy it.

The goal of this certification program is to provide an opportunity for RCP manufacturers to certify that their products are not only environmentally friendly and safe, but that they are equal in performance quality to virgin paints. This should enable RCP manufacturers to sell more of their products and provide a real measure of product confidence to purchasers of RCP.

CERTIFICATION OPTIONS, CURRENT PAINT RECYCLING MANUFACTURING, RECYCLED PAINT TESTING

The initial phase of developing a certification system for RCP was a review of current RCP manufacturing processes and existing certification options. This review was prepared for the PSSI Markets Workgroup by California Polytechnic State University (Cal Poly), San Luis Obispo.

Research on Current Recycled Paint Manufacturing

Paint products produced from post-consumer waste (PCW—also called leftover paint) products include consolidated paint (both water-based and solvent-based) and reprocessed latex (water-based) paint. Consolidated paint usually consists of at least 95% PCW paint, with the possible addition of very small amounts of additives. Paint consolidation is the process of combining leftover paints that have similar characteristics into batches. Consolidation is done at municipal facilities following collection events and at a

Table 1—State Purchase of Recycled Content Paint

Budget Year	All Purchases (Qty)	All Purchases (Dollars)	RCP Purchases (Qty)	RCP Purchases (Dollars)	% of RCP (Qty)	% of RCP (Dollars)
2003/2004*	381,117	\$4,019,636	48,507	\$352,739	12.7%	8.8%
2000/2001	297,174	\$2,840,719	75,161	\$428,394	25%	15%

* As of March 16, 2005, this report which includes FY 2003/04 and FY 04, 147 out of 217 agencies had reported to CDMG.

small number of retailers. The consolidation process typically involves the following steps:

- (1) Screening out of unusable paint
- (2) Sorting paint based on whether it is oil or latex paint
- (3) Sorting by characteristics such as color, finish, and type (e.g., interior versus exterior)
- (4) Pouring the latex leftover paint from the original containers into collection drums
- (5) Mixing

Consolidation operations also filter the paint to remove large particles and other solids. Many perform periodic testing for contaminants. The consolidated paint is often packaged in five-gallon containers for reuse. This activity is conducted mostly by local programs in batch sizes ranging from 30 to 200 gallons.

Reprocessed latex paint is a completely remanufactured product using PCW latex paint as a primary ingredient. Production of reprocessed paint involves processes characteristic of virgin latex paint production, and thus is not typically done at municipal collection facilities. PCW is combined with virgin ingredients (resin, pigments, additives) and secondary industrial materials including surplus paint (miss-tints, off-batches, discontinued products) to produce the reprocessed paint. PCW content of reprocessed latex paint often varies depending on the manufacturer, the PCW, and the product desired. Manufacturers maintain a minimum of 50% recycled content (PCW and secondary industrial materials). Manufacturers use a variety of sorting protocols and often perform preliminary testing on the PCW collected. A variety of tests are also performed on the final product.

In order to obtain a clearer picture of current recycled paint manufacturing processes, a questionnaire was developed and sent to members of the Markets Workgroup involved in recycled paint manufacturing in both the United States and Canada.

Eight manufacturers of recycled paint products in the United States and Canada were contacted and all eight provided responses. A summary of the responses follows.

Consolidated Paint

Five of the eight manufacturers produce only consolidated paint. Three of these produce only latex paint while two produce latex and alkyd. One company also produces stains, varnishes, and primers. The primary latex paint produced is exterior or exterior/interior but some manufacturers produce separate interior and exterior latex paints.

According to the manufacturers, initial inspection of these products ranges from fairly simple visual and

odor tests to much more comprehensive tests including VOC level, pH, and heavy metal analysis. Incoming material is primarily sorted by color. Other sorting parameters include gloss level or sheen, resin type, and listed application (interior/exterior). These products are all 100% or nearly 100% PCW. Some manufacturers include manufacturing overruns, expired products, and miss-tints in these products. Minor amounts of additives are sometimes added, particularly anti-fungal agents. Testing on these products varies widely.

Tests used include VOC analysis, heavy metal analysis, PCB analysis, gloss, grind, density, viscosity, sag and leveling, dry time, pH, percent solids, mold and fungus, freeze-thaw stability, color, and performance testing (scrub, stain, washability, adhesion, and even exterior weathering and UV durability). Virtually no information was collected on the frequency of any of these tests nor standards used for comparison in these tests. It is assumed relevant ASTM testing procedures are used. No manufacturer currently certifies their consolidated paint as meeting any published performance standards. Manufacturers certify their products comply with requirements for VOC content and mercury and lead levels. Some use published standards as guidelines and most have internal standards, sometimes based on virgin paint specifications.

These consolidated paint products are primarily sold to consumers either directly by the manufacturer or through retail outlets, but they are also used by commercial and governmental agencies. Products are also shipped overseas.

Reprocessed Paint

Three of the eight companies produce reprocessed paint. According to survey results, these companies do not generally also produce consolidated paint products. The products produced are almost entirely interior, interior/exterior, and exterior latex paints. Small amounts of elastomeric coatings (highly flexible barrier coatings) are also produced.

Testing on collected PCW ranges from only visual and odor to pH, viscosity, density, grind, color, percent solids, water content, and VOC levels. Incoming material is sorted by color, gloss level, interior/exterior, solids, and quality (no parameters specified).

The PCW content of the reprocessed paints ranges from 50–95%. One manufacturer always maintains PCW content above 70%. The PCW content may depend on gloss level desired (higher gloss generally means lower PCW content) and color (darker colors may have higher PCW content). Materials added to PCW in remanufacturing include virgin resin, pigments, colorants, rheological additives, biocides, and generally any ingredient added to virgin paint.



Tests on the final product are generally the same as those done on virgin paint products of similar type. These include VOC level, sag, scrub, viscosity, gloss, pH, coalescence, adhesion, percent solids, etc. One manufacturer also tests competitors' recycled paint products. Internal standards are used to ensure quality. No manufacturer currently certifies their reprocessed

paint as meeting any published performance standards. Manufacturers certify that their products comply with requirements for VOC content and mercury and lead levels.

The reprocessed paint products are sold through company-owned stores or contracted vendors. Users include government agencies, consumers, contractors, school districts, and non-profit organizations.

The labels used on both consolidated and reprocessed paints generally give information on the PCW content of the product. For consolidated paints, labels give simple directions for use, clean-up, disposal, and cautions concerning ventilation, keeping away from children, ingestion, skin/eye contact, and washing after use. For reprocessed paints, labels are more detailed, describing maximum VOC content, surface preparation, priming, material preparation, application, coverage, dry time, clean up, first aid, and cautions similar to those for consolidated paint including protection from freezing.

Research on Certification Options

Currently available standards and certifications for both recycled and virgin paint were researched. An attempt was made to identify all relevant procurement standards including those from public agencies and the private sector, including the United States Environmental Protection Agency (EPA) and Federal General Services Administration (GSA), and the California Public Contract Code. Additionally, an attempt was made to identify all relevant national performance and environmental standards, testing, and certification organizations including the Master Painters Institute

(MPI), Scientific Certification Systems (SCS), ASTM International, and non-governmental organizations involved with environmental standards, such as Building for Environmental and Sustainability (BEES), Green Seal, and individual manufacturers.

EPA (UNITED STATES ENVIRONMENTAL PROTECTION AGENCY): The Environmental Protection Agency worked through the 1990s to develop guidelines for reprocessed and consolidated paints. Input was solicited from all sectors of the coatings industry. The recommended recovered materials content levels for reprocessed and consolidated latex paints developed as a result of this work are given below:

Product	Post-Consumer Content (%)	Total Recovered Materials Content (%)
Reprocessed Latex Paint		
White, off-white, pastel colors	20	20
Gray, brown, earth tones, and other dark colors	50-99	50-99
Consolidated Latex Paint	100	100

Originally, the EPA product recommendation for reprocessed and consolidated latex paint was GSA specification TT-P-2846, Paint, Latex (Recycled with Post-Consumer Waste). TT-P-2846 was withdrawn in 2001 and EPA now recommends procuring agencies refer to GSA commercial item (CID) A-A-3185 Paint, Latex (Containing Post-Consumer Material), described more fully under the GSA heading below. The relevant information is available at <http://www.epa.gov/cpg/products/paint.htm#recommended>.

Although it does not have a specific specification for recycled paint, the EPA does specify procedures for determining environmental properties of paint, notably Method 24 for determination of VOC levels in paint available at <http://www.epa.gov/un/emc/promgate.html>.

GSA (UNITED STATES GENERAL SERVICES ADMINISTRATION): As mentioned, the General Services Administration had published a specification for recycled paint entitled TT-P-2846, Paint, Latex (Recycled with Post-Consumer Waste). This specification was withdrawn in 2001 and was replaced with CID A-A-3185 Paint, Latex (Containing Post-Consumer Material). The reason for the replacement of TT-P-2846 is not known by the authors of this report. A-A-3185 was adopted on April 3, 2001, and can be found at <http://dsp.dla.mil>. Once on the site, select "online specs," then "click here to get DSP files" then "assist quick search." For ID, use A-A-3185.

A-A-3185 covers latex emulsion paint containing a minimum of 20% post-consumer materials. Latex paint is classified into three types: I—interior; II—exterior; III—interior/exterior; three classes: 1—flat (low sheen), 2—eggshell, 3—semi-gloss; and three grades: A—40% minimum volume solids, B—30% minimum solids,

C—utility (for graffiti abatement). The A-A-3185 standard lists prohibited materials, condition in container, color tolerance, accelerated storage, freeze-thaw stability, application properties, odor, dry-through, consistency, VOC content, contrast ratio, alkali resistance, flexibility, scrub resistance, biological growth, total solids, fineness of dispersion, gloss, adhesion, and special marking of "Do Not Freeze." Quantitative requirements for each grade and class are specified, as are test methods (either ASTM or Federal Standard).

Grades A and B, white/off-white/pastel must contain 20% minimum PCW. Grades A and B, gray/brown, earth tones, dark, must contain 50% minimum PCW. All Grade C must contain 100% PCW. All must have <200 g/L VOC (calculated less water and exempt solvents). The intended use and surface preparation are also described. Ordering data and bid evaluation information are also given. National Stock Numbers (NSNs) have been assigned for all types, classes, and grades.

CALIFORNIA PUBLIC CONTRACT CODE: The California Public Contract Code discusses recycled paint in section 12170, paragraph 4:

4. (A) Recycled paint means having a recycled content consisting of at least 50% post-consumer paint. Pre-consumer or secondary paint does not qualify as recycled paint pursuant to this subparagraph. (B) If paint containing 50% post-consumer is unavailable, a state agency may substitute paint with the maximum amount of post-consumer content, but not less than 10% post consumer content. (www.leginfo.ca.gov/calaw.html)

Although this is not a performance standard, it does provide a relevant definition of recycled paint in terms of post-consumer waste content.

MPI (MASTER PAINTERS INSTITUTE): The Master Painters Institute was created in 1996, and evolved over a period of 100 years from The Master House Painters and Decorators Association of USA. MPI maintains an extensive website at <http://www.paintinfo.com/>.

Two of the most significant MPI publications are their *Maintenance Repainting Manual* and *Architectural Painting Specification Manual*. These manuals provide extensive guidelines on choosing the appropriate paint for a particular surface and describe in detail how the surface should be prepared and how the paint should be applied. MPI provides detailed guidelines on writing paint specifications for a particular application.

MPI maintains the MPI Approved Products List, which identifies manufacturers whose products have been tested and approved by MPI for over 170 different categories of paint. Each of these categories describes a paint designed for a particular application, with particular performance and appearance properties. According to Barry Law, MPI president, "MPI Standards have

replaced the former U.S. Federal Paint Standards, and are now referenced by the U.S. government, the U.S. Military, the IA MasterSpec, Spec Tank, the Canadian Government's National Master Specification, etc. They pretty much are 'all the relevant standards' relative to virgin architectural coatings."

In developing its standards, MPI has also developed its own gloss and sheen classifications. More than one MPI standard might apply to a particular type of paint. Here, an example using "eggshell" interior latex:

MPI #	Category name
52	Interior Latex, MPI Gloss Level 3 (an 'eggshell-like' finish)
139	Interior High Performance Latex, MPI Gloss Level 3
145	Institutional Low Odor/VOC Interior Latex, MPI Gloss Level 3
151	Interior W.B. Tight Industrial Coating, MPI Gloss Level 3

The MPI #52 standard lists specifications for toxic elements, viscosity, fineness of grind, gloss, hiding power, reflectance, alkali resistance, scrubability, package stability, applicability, appearance, and flexibility. The MPI #139 standard has more stringent scrubability specifications and additional specifications for burnish resistance and cleansability. The MPI #145 standard adds a VOC limit of 10 g/L and an odor specification is added to the MPI #139 standard. The MPI #151 standard is the same as that for MPI #52 with a more stringent scrubability specification, a chemical resistance specification replacing the alkali resistance specification. It also specifies the paint must be based on an acrylic resin.

The MPI standards provide detailed instructions for test methods, often with references to ASTM or EPA methods. Labeling details are also specified.

To be qualified and approved for listing by MPI, products must be tested by MPI to assure compliance. Continued compliance is confirmed by periodic MPI testing. All costs for testing are borne by the manufacturer.

MPI recently announced its MPI Green PerformanceTM Standard for paints and coatings, designated GPS-1-05. The standard designates those products meeting performance requirements, banned chemical list requirements, and current and future maximum VOC limits.

BEES (BUILDING FOR ENVIRONMENTAL AND ECONOMIC SUSTAINABILITY): BEES is a methodology taking a multidimensional, life-cycle approach to assessing impact of a wide range of products on the environment. Economic analysis of products throughout their life-cycle is an integral part of this methodology. This automated method for measuring the life cycle environmental and economic

performance of building products has been developed by the Building and Fire Research Laboratory of the National Institute of Standards and Technology (NIST). The effect of 1 ft² of a product over a 50-year cycle is used as a standard measure to compare alternative products for a given application. Environmental impact of a product is analyzed on the basis of the 12 attributes listed below:

- Global Warming
- Acidification
- Eutrophication
- Fossil Fuel Depletion
- Indoor Air Quality
- Habitat Alteration
- Water Intake
- Criteria Air Pollutants
- Human Health
- Smog
- Ozone Depletion
- Ecological Toxicity

Economic score is based on two attributes— First Cost and Future Costs. The BEES 3.0 software package and an accompanying report can be downloaded from the BEES website, <http://www.bfrl.nist.gov/oa/software/bees.html>.

In the current version of BEES (Version 3.0), a

economic scores based on BEES can serve as a tool in an objective determination of the impact of recycling latex paints. A favorable BEES score would be a valuable marketing tool. According to Barbara Lippiatt of NIST, work on version 4.0 of BEES is in progress.

SCS (SCIENTIFIC CERTIFICATION SYSTEMS): SCS is a third-party certifying agency involved in certifying materials in a wide range of fields, including food and agriculture, manufacturing, forestry, fisheries, electricity, and CSR (corporate social responsibility) purchasing. SCS services include environmental certifications and life-cycle assessments. Certification of paints and coatings would be handled through the Manufacturing Division. The familiarity of SCS with coatings and coating formulations appears to be very limited.

GREEN SEAL: Green Seal is an independent non-profit organization whose mission is "to achieve a more sustainable world by promoting environmentally responsible production, purchasing, and products." Green Seal follows the Guiding Principles and Procedures for Type I Environmental Labeling adopted by the International Organization for Standardization (ISO 14024). Green Seal is well known in the environmental community for its involvement in activities stated in their mission. Among the many product certification standards available from Green Seal, there are two

certification standards for paints: GS-11 (Paints) and GC-03 (Anti-Corrosive Paints). GS-11 deals with architectural interior topcoats and exterior topcoats, and thus is relevant to this report. The complete GS-11 standard is available at <http://www.greenseal.org/standards/paints.htm>.

Information on paint products along with names of manufacturers marketing virgin latex paints certified under GS-11 can be found at <http://www.greenseal.org/certproducts.htm#paints>.

Currently, no recycled paint product is marketed with Green Seal certification.

ASTM INTERNATIONAL (FORMERLY KNOWN AS THE AMERICAN SOCIETY FOR TESTING AND MATERIALS, OR SIMPLY ASTM): ASTM standard test methods are widely used, both within the United States and internationally, in determining the performance of coatings and other materials. ASTM has no certification methodologies for paints or related products. However, ASTM test methods are integral to the certification methodologies discussed above. ASTM has developed standards for other recycled products, including paper.

generic, virgin, interior wall paint is compared with a generic recycled paint containing 65% recycled content. Based on the formulation information provided, the two examples are for white paints. In our assessment, although the assumptions used in analyzing the two examples require further review, BEES methodology is a useful tool that should be considered at a more detailed level during future activities. Environmental and



Based on the results of this initial review, the PPSI Markets Workgroup decided to pursue a certification through Green Seal with performance certification by MPI.

RECYCLED CONTENT LATEX PAINT STANDARD

A contract was issued to Green Seal and they were given the primary responsibility for drafting the recycled content latex paint standard. Green Seal worked closely with the Markets Workgroup, particularly PSI, MPI, recycled paint manufacturers, and Cal Poly during initial phases of the development of the standard. Monthly conference calls were held with all Markets Workgroup participants to insure all parties were intimately involved in the process.

During this phase, recycled paint manufacturers submitted samples of their products to MPI to determine if they could meet MPI performance standards for comparable virgin paint products. All reprocessed paint samples passed the MPI performance tests. Many consolidated paint samples passed but some did not. This gave the Markets Workgroup confidence that recycled content paints could be manufactured to meet the same rigorous performance standards as comparable virgin paints.

Several key issues came to the fore during discussions of the proposed standard. Three of the most significant were: (1) the possible variability a product due to the variable nature of the leftover paint used; (2) the acceptable level of volatile organic compounds (VOCs) in a product; and (3) the percent of post-consumer paint content in both the reprocessed and consolidated paint products.

The variability of the supply of post-consumer (leftover) paint has always been a concern with recycled paint products. Although all latex paints are similar in that they contain latex polymer binders, pigments, and additives, different types of binders, pigments, and additives are often used in paints formulated specifically for interior or exterior uses. Currently, most reprocessed and all consolidated recycled paint manufacturers combine both interior and exterior latex paints for their products. Concern was raised over whether this might compromise the quality of the product. In addition, another concern was whether enough white leftover paint was available to produce sufficient reprocessed white paint containing a minimum of 50% post-consumer waste paint. A decision was made to keep the post-consumer waste content for reprocessed paint at the 50% minimum level. In addition, specific definitions were developed for sorted and non-sorted paints and for the frequency of performance testing required to meet MPI

Table 2—MPI Testing Frequency Matrix

	Sorted	Non-Sorted
Consolidated	Every 4 months (3 times/year)	Every 3 months (4 times/year)
Reprocessed	Every 6 months (2 times/year)	Every 4 months (3 times/year)

DEFINITIONS

Consolidated Paints: Paints that contain a minimum of 95% by volume post-consumer paint, with a maximum of 5% by volume secondary industrial materials or virgin materials.

Reprocessed Paints: Paints that contain a minimum of 50% by volume post-consumer paint, with a maximum of 50% by volume secondary industrial materials or virgin materials.

Sorted Paints: Blended materials that do not combine "interior only" paints with "exterior only" paints, but may include "dual-purpose interior/exterior" paints.

Non-Sorted Paints: Blended materials that combine "interior only" paints with "exterior only" paints, and may also include "dual-purpose interior/exterior" paints.

certification for these products. The testing frequency matrix that was developed and associated definitions are given in Table 2.

Since the certification implies both environmental and performance standards, some Workgroup members felt the VOC limit should be set at a lower level, such as 50 g/L. However, any use of recycled paint products results in a lowering of VOCs compared to using additional virgin paint. Also, many states, including California, allow a maximum of 250 g/L VOC in recycled paint products. Thus, the 250 g/L VOC level was deemed appropriate for the recycled paint products.

Per the draft of the certification, a manufacturer shall demonstrate that the finished products contain a maximum VOC level of 250 g/l as determined by the U.S. Environmental Protection Agency (EPA) Reference Test Method 24. The calculation of VOC level shall not include water but shall include tinting color previously added. Information shall be provided to justify the basis used to select the batch samples for VOC level testing. The selection of test samples shall reflect typical batch sizes, variation in recycled paint input, and total number of batches produced. If a manufacturer can document that the recycled paint product has a lower level of VOCs, Green Seal will certify the product as being at that lower level.

The draft standard was circulated to the widest possible audience for public comment. All comments were addressed and the final standard was submitted for balloting to the entire PPSI Markets Workgroup in July, 2006. The standard received unanimous support from the 21 of 27 members who voted. The complete stan-

dard. Recycled Content Latex Paint Standard (GS-43), is available at: www.greenseal.org/certification/environmental.cfm.



In order to meet the Green Seal standard, documentation must be provided showing that the paint also meets the appropriate MPI performance standard. MPI has developed detailed performance standards for interior and exterior consolidated and reprocessed recycled content latex paints at various gloss levels. For example, two of the new MPI standards are:

- MPI #14-RC Consolidated recycled interior latex paint, MPI gloss level 2
- MPI #44-RR Reprocessed interior latex paint, MPI gloss level 2

These MPI standards require the paint to meet the same performance requirements as virgin paints in the same category (for example, MPI #14). The only significant difference between the recycled and virgin paint standards is the frequency of testing required by MPI as described earlier.

Paints certified by MPI will appear on the MPI Approved Products List for the appropriate category.

Paints that meet the GS-43 standard will earn the Green Seal of approval, and will be able to display the Green Seal Certification Mark, which is a registered mark.

CONCLUSION

The goal of developing a national environmental and performance standard for recycled-content latex paint has been achieved. The standard is aimed at assuring consumers that recycled paint, in addition to being environmentally beneficial, can perform as well as virgin paint, both in terms of ease of application and quality and longevity of finish.

Green Seal, the Product Stewardship Institute, the Master Painters Institute, and a nationwide workgroup of concerned parties came together to create this standard. Recycled paint will now have to meet the same MPI performance standards used for virgin paint in any given category. The final standard takes into account the quality, performance, and safety of recycled paint, as well as environmental attributes.

Consumer concern over paint performance has been one of the greatest impediments to increasing the use of recycled paint. The development of this standard should not only provide consumers independent verification of the performance of recycled paint, but will also increase the use of recycled paint and create value from a product otherwise considered waste.

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