RESPONSE TO COMMENTS ON PROPOSED REVISIONS TO STANDARD FOR PAINTS AND COATINGS (GS-11)
Proposed Revisions for Public Comment December 6, 2007

(Each section of the proposed revised standard that received comments is given followed by any comments received on the section and Green Seal's response to comments. *Updated draft revisions are given in italics*.)

General Comments

Comment: Thank you for the invitation to address our concerns.

Comment: We are glad to have the opportunity to submit comments concerning the draft revisions to Green Seal Standard GS-11, Environmental Standard for Paint. Reviewing the comments provided to the Scoping Document we understand that changes to existing standards such as GS-11 are difficult in that different stakeholders may advocate for diametrically opposed positions. We appreciate that Green Seal's standard-setting process is open, collaborative, and transparent, and support the stated intent to promote environmentally responsible products.

Comment: Thank you for the opportunity to comment on the proposed GS-11 Paints Revision. As we expressed in our comments on the GS-11 Paint Environmental Standard Scoping Document in June 2007, [---] is concerned about the implications that the revised GS-11 standard may have on [---] products. [---] still believes that changes to the current GS-11 standard are not needed at this time and we remain concerned that any changes will lead to confusion and inconsistencies between the old and revised standard. In addition, we believe that the proposed changes will make it very difficult for coatings manufacturers to meet the stringent standard. As a result, the proposed standard may prove not to be useful and even obsolete in the future.

Comment: As stated earlier, we believe that the proposed changes will make it very difficult for paint coatings manufacturers to meet the stringent standard, as a result the proposed standard may prove not to be useful and even obsolete in the future.

Comment: As stated, [---] believes that the proposed changes will make it extremely difficult to maintain our current certifications and should not be implemented at this time.

Comment: In general, we support the [---] comments already submitted, beginning with the observation that there does not appear to be any compelling reason to revise the standard at this time. Perhaps Green Seal believes that it has been certifying too many coatings under the current standards, and would like to be more restrictive. The proposed revision would certainly have the effect of drastically reducing the number of coatings eligible for certification. We believe, however, that doing so would unnecessarily limit the utility of the standard, not only because fewer coatings would qualify under the revised standard but also because those coatings would be suitable for fewer applications due to performance limitations. We are aware of numerous complaints regarding the performance of coatings that comply with the current standard, expressed by architects and specifiers who have required the use of such coatings on projects seeking certification under the LEED program of the U.S. Green Building Council. We expect that there would be strong opposition to the incorporation of the revised standard, as proposed, into the LEED rating system criteria.

Comment: [---] is, and will be in the future, an environmentally responsible paint manufacturer. We are asking Green Seal to consider the technology that may or may not be available today to [---] and the rest of the Paint Industry before creating a standard that we can not effectively meet.

Response: Green Seal acknowledges the comments, but believes that a revision is warranted as there have been formulation and technological advances since the original paint standard was issued in 1993. Green Seal's aim is to develop leadership standards that recognize environmental excellence in products and to reward those manufacturers which go above the minimum statutory and regulatory requirements. Through such means such as public comments received and supplemental research, Green Seal will take into consideration available technologies at this time and make appropriate updates to the proposed standard to ensure it meets Green Seal's aim for the standard.

Comment: Product-specific performance requirements are not appropriate to the scope of a Green Seal environmental standard. This standard is to provide environmental requirements. Performance requirements should be determined by the end user. Putting performance restrictions on products significantly narrows the choices for consumers. They should be able to purchase environmentally preferred products at all price points, not just high quality (higher cost) products.

Response: Green Seal follows the International Organization of Standardization (ISO) 14024 Guiding Principles and Procedures, which require the inclusion of acceptable functional performance requirements for Type I Environmental Labeling. Therefore, maintaining acceptable functional performance is important to Green Seal when certifying environmentally preferable products. To ensure adequate performance, Green Seal chose to require the attainment of key performance criteria, which may be compromised in the attainment of the environmental criteria in the standard.

1.0 Scope

This standard establishes environmental requirements for paints and coatings. The standard includes wall, floor and reflective coatings, primers and undercoats and rust preventative coatings. The standard does not include stains, clear finishes, recycled (consolidated or reprocessed) latex paint, specialty paints (industrial, marine and automotive coatings), or paint sold in aerosol cans.

Comment: Is there any chance a recycled latex paint could qualify for GS-11 certification, especially if it already qualified for GS-43 certification?

Comment: I don't see any reason why not. As long as the base polymer meets the specified VOC's. But let's be honest, just about any water-borne coating sold within California meets GS-11 VOC requirements. I think it's a great idea, though. In other countries, recylced polymers are used to coat tagged walls within inner cities and some companies are trying modifying used latex into asphalt emlusion to improve the solar reflectance of the black surface.

Response: Green Seal believes there is a distinction between recycled latex paint and the paints and coatings covered under GS-11. Recycled (consolidated and reprocessed) latex paint is not covered under the standard for Paints and Coatings (GS-11) because there are different considerations for the life-cycle of the product. Recycled latex paint can be certified under the Green Seal standard for Recycled-Content Latex Paint (GS-43).

Comment: I have only just found out about your intended plans to create a speciifcation for heat-reflective paints wall paints. As a manufacturer and distributor of these coatings, I cannot emphasize their importantance, not because of my bias, but rather for the built environment as a whole. Everything we are discovering about the global warming phenomenon is effected by the sun's heat and co-factors such as man-made warming from carbon emissions which we may have some possible effect upon though our proactive actions as human society. The use of these low toxic, Infra-red, mixed metal oxide pigmented, ultra-durable paints will enhance the possibility that we can passively reduce the "urban heat island effect" in our cities through correct specification and application of such coatings. For this reason, I urge that Green Seal adopt

standards which support the implementation of a GS-11 "cool wall" paint specification, but most especially, that it should be along the stronger limits and guidlelines that [---] has submitted and has been speaking to in his commentary to your organization and constituents for the past month.

Comment: Simply speaking, one size does not fit all in the coatings world. The scope as written now is simultaneously too broad for the architectural categories it seemingly is geared towards yet too restrictive for the sub-categories it is trying to assimilate, such as reflective coatings, floor coatings and rust preventative coatings. All things to nobody or no good to everybody seems to be the foundation this scope is built upon. Please consider [---]'s suggestions for this GS-11 scope, and for all sections covered within this proposed revision.

Comment: I agree with the comments made by [---] and [---]. The standard is trying to group too many different coatings categories together with the architectural coatings category. These requirements make little sense when they are applied to floor coatings and rust preventative coatings, specifically. Clearly, trying to satisfy every group and use of paints with the same performance requirements will be a never-ending loop. We encourage much more discussion on this topic before finalizing the standard.

Comment: The current GS-11 standard covers architectural paints, to change the scope of this standard at this time would lead to confusion and inconsistencies; therefore[---] recommends that Green Seal not change the scope of GS-11. [---] also suggests that other coatings are much different than architectural coatings – as such others coatings should not be included in GS-11.

Comment: We would support expanding the scope of the standard to include opaque primers, sealers, and undercoaters (as a single category), and incorporating the standard for anti-corrosive paints. That category, however, should not be changed to “Rust Preventative Coatings,” because that constitutes a category defined by regulations and, in some jurisdictions, subject to usage limitations that would be inappropriate in this context. We suggest that these coatings should continue to be described in the standard as “anti-corrosive,” or “corrosion-inhibiting.”

Comment: Green Seal is modifying its coating standard, GS-11, to reflect today’s environmental concerns. The biggest area of concern is greenhouse gases, global warming, energy conservation and Urban Heat Islands which is referenced under the Kyoto Treaty, EPA Clean Air Act, California AB 32, Title 24 and other air quality legislation. Green Seal can address these concerns by including a new energy-efficient requirement in to its new coating standards.

According to a 2007, ABC/Washington Post survey, 93% of Americans said they are concerned about the environment, while 74% said they would specifically purchase energy-efficient products to help reduce global warming. More energy-efficient coatings will be purchased if Green Seal adopt a new heat-reflective standard.

Response: Green Seal agrees with the comment and has changed “Rust Preventative Coatings” to “Anti-Corrosive Coatings”. Green Seal recognizes that there are differences, but the product categories listed: wall, floor, anti-corrosive, reflective coatings and primers and undercoats, are similar enough in formulation and environmental and human health impacts to be included within the scope of the Green Seal standard. The original standard for Anti-Corrosive Paints (GC-3) and the original standard for Paints (GS-11) differed only in terms of VOC limit and performance requirements. Primers and undercoats and some floor coatings were certified under the original GS-11. Therefore the only new product category is reflective coating. Green Seal agrees with the comments that reflective coatings are an important category particularly in terms of its impact on global climate change and Green Seal believes it can be treated within the same standard. Within the standard, Green Seal recognizes the differences in performance needs of each product category and formulation and has distinguished separate performance requirements and VOC limits for each of the specific product categories. Green Seal has also made additional clarifications to the scope. The scope now reads as follows:

This standard establishes environmental requirements for paints and coatings. The standard includes wall, floor, anti-corrosive, and reflective coatings and primers and undercoats. The standard does not include stains, clear finishes, recycled (consolidated or reprocessed) latex paint, specialty (industrial, marine and automotive) coatings, or paint sold in aerosol cans.

Comment: The scope is still unclear on the types of paints and coatings the standards are been established. I would like the paints and coatings defined as in the Masters Painters institute (MPI) Performance Standard.

Response: The scope as written is meant to be explicit, but not unnecessarily specific. The scope includes, but is not limited to wall, floor, anti-corrosive, and reflective coatings and primers and undercoats. Within the standard, distinctions have been made between Flat and Non-flat coatings as defined by U.S. Environmental Protection Agency 40 CFR, Part 59.

Comment: This Standard, in its original form and in its proposed revised form is specifically designed and targeted at latex paint. I cannot comment on the relevance or correctness of this standard for these materials as [---] does not make or sell any latex paint products. However, one thing that is conspicuously missing is a statement in the scope of this Standard stating that it does not properly cover, address, or make any reasonable inclusions or exclusions relative to urethane or epoxy coatings or flooring systems. By touting itself as a general "Paint Standard", this document is unfairly restricting free trade and preventing users from specifying high performance materials. As all formulators, manufactures, specifiers, and marketers to the flooring and concrete protection market know, epoxy and urethane products are extremely durable and last significantly longer than latex paints. While a latex paint may pass this GS11 standard and last 1 year (usually less) on a floor, we have installed and verified the service life of epoxy and urethane flooring systems at 10-20 years or longer. If you install latex paint 10-20 times, are you more environmentally friendly, than if you install one epoxy flooring system, regardless of any "green" comparison?

Comment: This proposed standard has very cleverly excluded the possible use of performance products with arbitrary ingredient exclusions and incorrect test methods. This standard is written around what a "green" latex paint can do and should not present itself as an all encompassing "Paint Standard". This Standard needs to expand the scope to declare that it is "for latex paint only" and does not cover, and should not exclude the use of urethane or epoxy products where they can offer superior performance. Perhaps addressing the "green" issues relevant to epoxy and urethane products in another document (as we proposed to you in 2005) would be beneficial to yourself and ultimately to your customers.

Response: The scope as written includes floor coatings and does not explicitly exclude epoxy or urethane floor coatings, provided they can pass the applicable criteria. While Green Seal recognizes that long-term durability is an important concern within the life-cycle of a product and includes key performance criteria to address this issue, Green Seal must also take into consideration other environmental and human health impacts such as exposure during application and the use and manufacture of hazardous chemicals in the formulation of products. High performing industrial products such as those that are factory-applied or other original equipment manufacturer (OEM) coatings that require additional considerations due to significantly higher performance requirements are excluded in the scope in the standard. Green Seal sets leadership standards for products included within the scope of the standard in order to promote sustainability in the marketplace and does not intend to restrict free trade or to prohibit the use of high performance materials where appropriate.

2.0 Definitions

Comment: Add the following definition: High Gloss Non-Flat: Paints or coatings whose specular gloss level at 60 degrees registers 70 or greater as measured by ASTM D523-89 (1999), Standard Test Method for Specular Gloss.

Response: Green Seal does not believe that the definition of High Gloss Non-Flat is needed as there is no distinction of High Gloss Non-Flat paint in the standard.

2.2. Colorant: Concentrated color (dyes or pigments) that can be added to paints or coatings to make specific colors. Unless specified otherwise, it is the maximum amount of colorant recommended for use by the manufacturer.

Comment: Confusion on the term maximum amount of colorant recommended for use by the manufacturer- how is this related to the definition of "colorant?" Pigments used in the industry can be incorporated by a variety of methods by both the manufacturer and at the point of sale. Does this definition only refer to the colorants that are used in the field to tint bases? Or does it encompass shading pastes used by manufacturers in the plant to create a standardized color within each specific system? Does is go as far as to cover the dry inorganic and organic pigments that used by both colorant producers and paint manufacturers alike to create dispersions of various pigment blends that are ultimately used to create the "specific colors."

Comment: For clarification purposes, we would suggest the following language:
"Concentrated color (dyes or pigments) that can be added to finished paints or coatings to make specific colors. Unless specified otherwise, it is the maximum amount of colorant recommended for use by the manufacturer."

Comment: Eliminate definition.

Response: The clarification term, 'the maximum amount of colorant recommended for use', is stated since there can be a variable amount of colorant added to different sheens or bases. The colorant definition is intended to include colorants added at the point-of-sale since pigments added by the manufacturer will be considered within the materials audit as part of the formulation. Green Seal believes the definition of colorant is important in the specification of the standard and should be included and accepts the proposed change. The definition now reads as follows:

Colorant: Concentrated color (dyes or pigments) that can be added to finished paints or coatings to make specific colors. Unless specified otherwise, it is the maximum amount of colorant recommended for use by the manufacturer.

2.3. Flat: Paints or coatings whose specular gloss level at 60° registers less than 5 as measured by ASTM D523-89(1999), Standard Test Method for Specular Gloss.

Comment: We assign gloss level values and finish names to our recycled-content latex paint in accordance with the Master Painters Institute's MPI Gloss and Sheen Levels. As I understand, MPI is the leading performance certification organization; many coatings manufacturers produce MPI-certified products in order to remain competitive.

All of our batches are produced as either MPI Gloss Level 1 "Flat" (60° max 5 and 85° max 10) or MPI Gloss Level 2 "Velvet" (60° max 10 and 85° 10-35). Some of our batches measured 60° >5 and 85° <10, which is a range of values not addressed in the MPI standard. According to MPI, based on instrumental variations, a 60° gloss measurement >5 but <6 would qualify as a 5.

I propose, assuming other coatings manufacturers experience this measurement issue, the following:
1. The definition for Flat be amended to read "Paints or coatings whose specular gloss level at 60° registers less than 6…"

2. The definition for Non-Flat be amended to read “Paints or coatings whose specular gloss level at 60° registers 6 or greater…”

Comment: Please keep in mind the definitions of "flat" and "non-flat" that are currently used in the vast VOC regulatory world set forth by the EPA and other local regulatory agencies. Any definition conflicting with what the industry has become to accept as standard here for the purposes of obtaining VOC compliant paint products would be counterproductive.

Comment: For consistency, the definition of a Flat paint should conform to the definition that appears in EPA 40 CFR Part 59, which states a Flat registers a gloss of less than 15 on an 85-degree or less than 5 on a 60-degree meter according to ASTM Method D 523-89.

Response: Green Seal agrees with the comments to stay consistent with existing U.S. regulatory bodies and uses the U.S. Environmental Protection Agency definition listed in EPA 40 CFR Part 59, which states Flat registering a gloss of less than 15 on an 85-degree or less than 5 on a 60-degree meter according to ASTM Method D 523-89. No change has been made.

2.4. Hazardous Air Pollutant (HAP): Any compound listed by the U.S. Environmental Protection Agency in the Clean Air Act Section 112(b) (1) as a hazardous air pollutant.

Comment: Agreed.

Comment: Reference the date of the latest revision of U.S. EPA’s list as published in the Federal Register.

Response: The date of the latest revision of U.S. EPA’s Hazardous Air Pollutants list is June 6, 2007. The date is not included in Green Seal’s standard as EPA periodically reviews and revises the list and it is subject to future modifications. The Foreward included in for all Green Seal standards states the following:

Referenced Standards. Standards referenced in this document may have been superseded by a later edition, and it is intended that the most recent edition of all referenced standards be used in determining compliance of a product with this standard.

2.5. Ingredient: Any constituent of a product that is intentionally added or known to be a contaminant that comprises at least 0.01% by weight.

Comment: The key here is "known" to be a contaminant. Coatings manufacturers rely heavily, as blenders of "ingredients," on the disclosure of the chemical makeup from the suppliers of raw materials. Contaminants are often not listed down to the 0.01% level by weight currently by many suppliers and since many raw materials are "proprietary" in composition, a paint manufacturer is for all practical purposes limited in formulation by the level of reporting of ingredient composition by the supplier of that raw material.

Comment: Since raw material ingredient information is typically obtained from Material Safety Data Sheets (MSDS) we believe that setting the threshold concentration for an ingredient at 0.01% would make it extremely difficult to report compositional information from raw material suppliers. A threshold of 0.1% would be consistent with the Occupational Safety and Health Administration (OSHA) reporting requirements for carcinogens on MSDS.

Comment: Define this to conform with requirements of the OSHA Hazard Communication Standard, since the Material Safety Data Sheets constructed pursuant thereto are the most readily available source of information to confirm hazardous ingredient contents. Thus: “Any constituent of a product that is intentionally added or known to be a contaminant that comprises at least 1% by weight, or 0.1% by weight if the constituent is a carcinogen.”

Comment: Does the present definition means that any ingredient below 0.01% need not be made known? Does this cutoff level results in making known components of concern in the paints and coatings not regulated?

Response: Green Seal does not believe that the OSHA reporting level of 0.1% is stringent enough to protect human health and environment. In development of a leadership standard, Green Seal desires to set criteria that reward those manufacturers which go above the minimum statutory and regulatory requirements. The definition of ingredient (as defined by 0.01% by weight or 100 ppm) is appropriate as it is used in other Green Seal standards, including the Green Seal standard for Recycled-Content Latex Paint (GS-43). As coating manufacturers are often blenders of mixtures and may or may not be aware of all of the ingredients, the importance and role of Green Seal has often been to work with the raw material suppliers to obtain the necessary information and to notify the manufacturer if an issue arises. Components below 0.01% are not required to be disclosed by a raw material supplier; however, may be accounted for in other criteria in the standard such as the VOC limit or volatile aromatic limit.

2.6. Intentional Introduction: The act of deliberately utilizing a material prohibited in the standard in the formation of a package or packaging component where its continued presence is desired in the final package or packaging component to provide a specific characteristic, appearance, or quality.

Comment: [---] suggests deleting "prohibited in the standard" from the definition because it is not necessary or relevant to the meaning. The definition would then read as follows:
"The act of deliberately utilizing a material in the formation of a package or packaging component where its continued presence is desired in the final package or packaging component to provide a specific characteristic, appearance, or quality."

Response: Green Seal agrees and has removed the phrase "prohibited in the standard". The definition now reads as follows:

Intentional Introduction: The act of deliberately utilizing a material in the formation of a package or packaging component where its continued presence is desired in the final package or packaging component to provide a specific characteristic, appearance, or quality.

2.7. Mutagen: A chemical that meets the criteria for category 1, chemicals known to induce heritable mutations or to be regarded as if they induce heritable mutations in the germ cells of humans, under the Harmonized System for the Classification Of Chemicals Which Cause Mutations in Germ Cells (UN, 2003).

Comment: Is this consistent with the reproductive toxin lists from 2.16?

Response: The approach of using established peer-reviewed lists is to ensure that identified hazardous chemicals are prohibited in the finished product. Depending on the hazards of a certain chemical, it may be a listed as a mutagen and as a reproductive toxin or only as a mutagen or only a reproductive toxin. As Green Seal takes a preventative approach to human health hazards, Green Seal believes it is necessary to prohibit chemicals that have been identified and are listed as either mutagenic or toxic to reproductive systems. Green Seal has modified the definition to include the full reference document, which now reads as follows:

Mutagen: A chemical that meets the criteria for category 1, chemicals known to induce heritable mutations or to be regarded as if they induce heritable mutations in the germ cells of humans, under the Harmonized System for the Classification Of Chemicals Which Cause Mutations in Germ Cells (United Nations Economic Commission for Europe, Globally Harmonized System of Classification and Labeling of Chemicals).

2.8. Non-Flat: Paints or coatings whose specular gloss level at 60° registers 5 or greater as measured by ASTM D523-89(1999), Standard Test Method for Specular Gloss.

Comment: Please see my post under 2.3 Flat.

Comment: My sentiments as well.

Comment: For consistency, the definition of a Non-Flat paint should conform to the definition that appears in EPA 40 CFR Part 59, which states a Non-Flat registers a gloss of 15 or greater on an 85-degree or 5 or greater on a 60-degree meter according to ASTM Method D 523-89.

Response: Green Seal agrees with the comments to stay consistent with existing U.S. regulatory bodies and uses the U.S. EPA definition listed in EPA 40 CFR Part 59, which states Non-Flat registering a gloss of 15 or greater on an 85-degree or 5 or greater on a 60-degree meter according to ASTM Method D 523-89. No change has been made.

2.9. Ozone-Depleting Compounds: Any compound with an ozone-depletion potential greater than 0.01 (CFC 11=1).

Comment: Reducing VOCs is a step in the right direction, but it only accounts for a small reduction percentage of low level ozone depletion and urban smog. The CARB statistics put the amount of paint VOC compared to the total ROG in California at 0.4%. What will do a lot to protect the ozone and urban smog is low VOC coatings with energy efficiency features. Heat reflective coatings will cool properties down which will lower the amount of electricity used to run power generators. A lower electrical demand means less polluting fossil fuels are burned to run cooling systems and less pollutants released into the atmopshere.

Response: Green Seal agrees with the comments and acknowledges that there are other significant sources of VOC that contribute to smog and ozone depletion other than VOCs from paint. Green Seal intends to include reflective coatings in the scope of the standard due to the importance of this product category in terms of impacts on energy efficiency and global climate change.

Comment: For reference, what methods and standards will be used to determine the ozone depleting compounds?

Comment: There is no reference source; therefore, this definition should be eliminated.

Comment: Eliminate definition.

Response: The ozone-depleting potential is the ratio of impact to ozone as compared to a similar mass of CFC-11 as from the list maintained by the U.S. EPA of Class I and Class II ozone-depleting substances. Specific methodology for determining ozone-depleting potential is detailed in reports from the World Meteorological Association, the U.S. EPA and the Montreal Protocol agreement. Green Seal agrees that the definition should be clarified with a reference source. The definition now reads as follows:

Ozone-Depleting Compounds: Any compound with an ozone-depletion potential greater than 0.01 (CFC 11=1) according to the U.S. EPA list of Class I and Class II Ozone-Depleting Substances.

2.10. Paints: Liquid, liquefiable, or mastic composition that is converted to a solid adherent film after application to a substrate as a thin layer and is used for decorating, protecting, identifying or to serve some functional purpose such as the filling or concealing of surface irregularities or the modification of light and heat radiation characteristics and is intended for on-site application to interior or exterior surfaces of residential, commercial, institutional or industrial buildings.

Comment: Throughout this proposed standard, the terms Paint and Coating are used extensively, often together as Paint or Coating. There is a definition provided for Paint, but not for Coating. As I understand, the coatings industry terminology standard is that "paint" is a sub-set of "coatings," and that "coatings" includes paint, stains, primers, etc. ASTM, in *D 16 – 98b*, more or less uses the definition provided in this standard for Paints as the definition for Coating, and defines Paint as "a pigmented coating," though this is a general definition contrasted with a more specific definition provided in the ASTM standard, as well.

If the proposal below for the terms and definitions for Coatings and Paints were accepted into this proposed standard, then several portions of the standard could be truncated to read "coatings" instead of "paints and coatings."

I propose the following:
1. The term Coatings be added to the definitions,
2. The current definition provided for Paints be applied to the term Coatings.
3. The definition "a pigmented coating" or more appropriate definition be applied to the term Paints.
4. Truncate "paints and coatings" throughout standard to read "coatings."

Response: Comments received from the Scoping Document stated that the words "paints" and "coatings" should not be used interchangeably, but that the industry recognized definition of the "thin layer" for paints is 6 mil dry film thickness (DFT) or less and coatings is defined as 6 mil DFT or more. However, for clarification, Green Seal agrees with the comment and has added a definition of "Coatings" and modified the definition of "Paints" according to ASTM D16-03. According to ASTM D16-03, the following definition of Coatings does not include Stains, as a Coating "is converted to a solid adherent film after application to a substrate as a thin layer", while a stain is "usually transparent and leaving practically no surface film". The Green Seal definition also specifies "on-site application", which would imply exclusion of factory-applied or original equipment manufactured (OEM) coatings such as specialty (industrial, marine and automotive) coatings. However, for clarification, the excluded product categories listed in the scope are reiterated in the definition. The definitions of "Paint" and "Coating" now read as follows:

Coating: Liquid, liquefiable, or mastic composition that is converted to a solid adherent film after application to a substrate as a thin layer and is used for decorating, protecting, identifying or to serve some functional purpose such as the filling or concealing of surface irregularities or the modification of light and heat radiation characteristics and is intended for on-site application to interior or exterior surfaces of residential, commercial, institutional or industrial buildings. For the purposes of this standard, the definition of paint or coating does not include stains, clear finishes, recycled latex paint, specialty (industrial, marine or automotive) coatings, and paint sold in aerosol cans.

Paint: A pigmented coating. See definition for Coating.

Comment: See comments on 1.0 Scope.
Comments on 1.0 Scope: "Simply speaking, one size does not fit all in the coatings world. The scope as written now is simultaneously too broad for the architectural categories it seemingly is geared towards yet too restrictive for the sub-categories it is trying to assimilate, such as reflective coatings, floor coatings and rust preventative coatings. All things to nobody or no good to everybody seems to be the foundation this scope is built upon. Please consider [---]'s suggestions for this GS-11 scope, and for all sections covered within this proposed revision."

Comment: [---] recommends the Environmental Protection Agency (EPA) National Architectural and Industrial Maintenance (AIM) Rule definition of paint be used for this definition.

Response: The EPA AIM Rule definition does not list a definition of "paint", but the definition of "coating" is listed as "a material applied onto or impregnated into a substrate for protective,

decorative or functional purposes. Such materials include, but are not limited to paints, varnishes, sealants, inks, maskants and temporary coatings. Protective, decorative or functional materials that consist only of solvent, acids, bases, or any combination of these substances are not considered coatings for the purposes of this subpart." The EPA AIM definition includes additional subcategories that are not included in the standard. The definition of "Paint" and "Coating" used in the standard is modified from ASTM D16-03.

2.11. Primers: The first coating applied to a substrate for surface preparation or to provide adhesion for subsequent coatings.

Comment: Add the following definition: Primers, Sealers & Undercoaters: Opaque coatings that are formulated and recommended for one or more of the following purposes: to provide a firm bond between the substrate and a subsequent coating; to prevent a subsequent coating from being absorbed into the substrate; to prevent harm to a subsequent coating from materials in the substrate; to provide a smooth surface for application of a subsequent coating; or to block materials from penetrating into or leaching out of the substrate.

Comment: Consider the many options that are used as "first coatings" to many metallic substrates to achieve anti-corrosive properties. Incorporating GC-03 into GS-11 and looking to achieve anti-corrosive performance properties in Green Seal-certified paints necessitates consideration of all categories of "first coatings" as primers. Again, see 1.0 Scope comment.

Comment: Eliminate definition.

Response: The first coating of a coating formulated and recommended for use in preventing the corrosion of substrates would be considered an Anti-Corrosive coating. Green Seal agrees with the comments and has accepted the proposed changes with modification. The definition for "Primer or Undercoat" is as follows:

Primer or Undercoat: Coating that is formulated and recommended for one or more of the following purposes: to provide a firm bond between the substrate and a subsequent coating; to prevent a subsequent coating from being absorbed into the substrate; to prevent harm to a subsequent coating from materials in the substrate or to provide a smooth surface for application of a subsequent coating.

[The following definitions have been grouped together due to similar comments.]

2.12. Post-Consumer Material: Finished products, packages or materials generated by a business or consumer that have served their intended end uses, and that have been recovered from or otherwise diverted from the waste stream for the purpose of recycling.

2.13. Recovered Material: Material that has been recovered from or otherwise diverted from the waste generated after a material manufacturing process. Recovered material may include post-consumer material, cuttings, trimmings, obsolete inventories, and rejected unused stock, but does not include material capable of being re-used within the process that generated it.

Comment: Ironically the inclusion of post-consumer content into green coatings may introduce chemicals that show up on many of the proposed prohibited lists, therefore discouraging paint manufacturers to pursue recycled materials. Please consider this as the standards are developed. Case to consider- is it better to landfill used car tires or have them ground into recycled rubber to be reincorporated into environmentally responsible coatings? The Green Seal GS-11 revision needs to be aware of the ramifications of all aspects of sustainability and not unintentionally disqualify the use of many available sources of post-consumer material.

Comment: See comments on 2.12.

Response: For clarification, the Post-Consumer Material and Recovered Material definitions address packaging and are not in reference to the paint or coating formulation. Paint or coatings that contain recycled materials are specifically excluded in the scope, as those products are addressed in the Recycled Content Latex Standard (GS-43). In terms of packaging, Green Seal's desire is to encourage post-consumer content and material diversion from the waste stream; therefore, under the criteria for "Heavy Metals" and "Other Restrictions", an exception is allowed for packages that would not have restricted materials but for the addition of recovered materials. Also in line with Green Seal's intent to divert materials from the waste stream is the criterion for "Recovered Material Content", which directly promotes the use of recovered and post-consumer content in packaging.

2.14. Recyclable Package: The package can be collected in a substantial majority of communities, separated or recovered from the solid waste stream and used again, or reused in the manufacture or assembly of another package or product through an established recycling program.

Comment: With the dried residuals from the original contents as well? Or with specified cleaning of the recyclable package before it is acceptable to the recycler?

Response: Many communities accept empty steel cans with a dried paint film, as they can separate the paint film and send the steel can to the recycler according to the Steel Recycling Institute. Containers with liquid paint cannot be accepted for recycling and Green Seal encourages consulting with local authorities for recycling leftover paint. Although some polypropylene suppliers are able to recycle polypropylene with a dried paint residue, most plastic containers are not currently recyclable with the dried paint residue and have other technical and logistical hurdles to recyclability in the current system. Green Seal has assessed the current technology and has modified the Packaging requirement accordingly. Green Seal has also added the definition of "Primary Packaging" for consistency among Green Seal standards. The Primary Packaging definitions reads:

Primary Package. Package that is the material physically containing and coming into contact with the product, not including the cap or lid.

2.15. Reflective Coating: Coatings designed and intended for the modification of light and heat radiation characteristics.

Comment: We suggest omitting "of light" from this definition. Again, it is not necessary or relevant to the meaning of the term.

Response: Green Seal acknowledges the comment, but believes that "of light" is necessary for the clarification of the term as reflective coatings include those coatings with the intent to modify both heat and light. The reference to both UV light and heat radiation is similar to California Air Resources Board Suggested Control Measure 2007.

Comment: Energy-Efficient Wall Coatings To Combat Urban Heat Islands
Energy-efficient coatings reduce the surface temperature of walls thereby lowering radiant heat transfer within properties. A cooler property requires less electricity to operate air conditioning systems. Utility companies burn fewer fossil fuels to meet cooling demands. Power plants emit CO2 one of the three main greenhouse gases which contributes to global warming. A two-year study conducted by Oakridge National Laboratories (ORNL), a US Department Of Energy (DOE) research facility, found that reflective wall coatings saved between 4.2 and 21.9% on cooling costs during summer. If you multiply these energy savings by millions of homes within the US, the reduction in greenhouse gases and global warming would be significant.

According to Hashem Akbari, the head of the Urban Heat Island Program at Lawrence Berkeley National Laboratories (LBNL), for every kilowatt of power saved then 663 grams of CO2 would also be saved.

http://eetd.lbl.gov/HeatIsland/LEARN

http://www.texcotehomes.com/cool.asp

Comment: Problems And Solutions

Problem 1) Greenhouse Gases & Global Warming

Urban Heat Islands are caused by dark colored roofs, walls, pavements and lack of trees within cities. These dark surfaces absorb solar energy which heats cities up by 6-8% over surrounding suburbs. The higher temperatures within cities increases air conditioning usage and raises pollution levels because utility companies are burning more fossil fuels to run generators to cool cities down. For every ten degrees over 70-F smog rates double.

Solution: By cooling down cities with energy-efficient wall coatings the Urban Heat Island effect can be lowered which reduces air conditioning consumption and airborne pollution generated by utility companies.

Problem 2) Public Heath And Safety Within Cities

SMOG- Increased heat, leads to increased air pollution which leads to smog and respiratory problems for inhabitants.

Heat Stoke- Increased heat levels within cities is often felt most by the old, handicapped and poor which either can not afford air conditioning or have faulty units. During the 1990 heat wave through the Midwest, thousands of people within urban cities either died or spent time in hositpitals because of excessive heat exhaustion.

Solution: By cooling down cities with energy-efficient wall coatings, smog and heat stroke can be reduced.

Cool Walls:
In many inner cities the walls surface area are significantly larger then the surface are of the roofs yet cool roofs are written into many state energy codes but not cool walls.

Walls also get a double dose of heat ingress from the electromagnetic radiation from the sun and reflection of solar energy off concrete and asphalt pavements back into the wall.

Cool Walls Benefit Urban Residential Properties
Just about all walls have no insulation at all covering the exterior wooden studs unless ridged foam insulation is used. Rigid foam is a solid, closed cell material which prevents interaction with air. Considering that wood framing accounts for approximately 25-percent of the entire wall surface area it's like one whole wall in the home with no insulation at all. The exposed studs allow thermal bridging to occur. Insulation also moves over time leading to air infiltration and cavity convection which significantly reduces the insulation R-value and increases the amount of BTU's used to cool the property down. Many residential homes are located within the confides of Urban Heat Islands.

Response: Green Seal acknowledges the comments and due to the ability of reflective coating to lower surface wall temperatures and the resulting reduction of greenhouse gases, smog and pollution as well as the dangers of exacerbated heat in urban areas and additional benefits to residential properties, intends to include reflective coatings in the scope of the standard.

2.16. Reproductive Toxin: A chemical listed as a reproductive toxin (including developmental, female, and male toxins) by the State of California under the Safe Drinking Water and Toxic Enforcement Act

of 1986 (California Code of Regulations, Title 22, Division 2, Subdivision 1, Chapter 3, Sections 1200, et. Seq.).

Comment: Is this consistent with mutagens listed from 2.7?

Response: The approach of using established peer-reviewed lists is to ensure that identified hazardous chemicals are prohibited in the finished product. Depending on the hazards of a certain chemical, it may be a listed as a mutagen and as a reproductive toxin or only as a mutagen or only a reproductive toxin. As Green Seal takes a preventative approach to human health hazards, Green Seal believes it is necessary to prohibit chemicals that have been identified and are listed as either mutagenic or toxic to reproductive systems.

2.17. Rust Preventative Coatings: Coatings formulated and recommended for use in preventing the corrosion of ferrous metal substrates.

Comment: See comments on Scope 1.0.
Comments on 1.0 Scope: "Simply speaking, one size does not fit all in the coatings world. The scope as written now is simultaneously too broad for the architectural categories it seemingly is geared towards yet too restrictive for the sub-categories it is trying to assimilate, such as reflective coatings, floor coatings and rust preventative coatings. All things to nobody or no good to everybody seems to be the foundation this scope is built upon. Please consider [---]'s suggestions for this GS-11 scope, and for all sections covered within this proposed revision."

Comments: Re-define as "Anti-Corrosive Coatings" or "Corrosion-Inhibiting Coatings," and delete the word "ferrous" from the definition, as many non-ferrous metals will corrode and therefore require protective coating.

Response: Green Seal believes that anti-corrosive coatings can be included within the scope by distinguishing specific performance criteria and VOC limits within the standard, particularly since the Green Seal Anti-Corrosive Paint (GC-3) and Paints (GS-11) standards differed only in terms of performance criteria and VOC limits. Green Seal agrees and "rust preventative coatings" has been changed to "anti-corrosive coatings" and has removed the word "ferrous" from the definition. The definition now reads as follows:

Anti-Corrosive Coatings: Coatings formulated and recommended for use in preventing the corrosion of metal substrates.

2.18. Topcoat: The outermost layer of a paint or coating.

Comment: To clarify the meaning of the term, we suggest adding the word "system".
"The outermost layer of a paint or coating system."

Response: Green Seal agrees and the word "system" has been added. The definition is now as follows:

Topcoat: The outermost layer of a paint or coating system.

2.19. Undercoat: The first of two or more coats of a paint or coating.

Comment: Right off the bat, without a definition for Coating (see my post under 2.10 Paints), these definitions can be confusing. If my proposed definitions for Coatings and Paints were incorporated into this standard, the definitions for Topcoat and Undercoat could be truncated to read "…of a coating." instead of "…of a paint or coating."

Foregoing the Coatings definition exclusion, there is confusion regarding the Primer and Undercoat definitions. Both of these definitions are applicable to the first coating, yet nothing in the definitions implies that they are the same type of coating except that they are two different

defined terms. Is undercoat a primer? Is primer an undercoat?

I'm assuming that the intent is to define Undercoat as the first coating of paint (or other coating) applied over a coating of Primer (when appropriate), an existing coating of paint (or other existing coating) or an uncoated substrate (again, when appropriate). ASTM, in *D 16 – 98b*, and MPI, in *The Master Painter's Glossary Version 4.0*, both provide the definition for Undercoat in this proposed standard as the definition for Primer.

While not mentioned in this proposed standard, these definitions beg the question "what are the coats between the undercoat and topcoat called?" Perhaps the term Intermediate Coat with an appropriate definition should be included, just to put the reader's mind at ease.

I propose the following:
1. Primer: Leave definition as is.
2. Undercoat: The first of two or more coatings (excluding primer) applied over primed or prepared substrate, usually intended to prepare substrate by obliterating surface imperfections.
3. Intercoat: Any coatings (including undercoat) applied between the primer and topcoat. This is more or less the MPI definition for Intermediate Coat.
4. Topcoat: Leave definition as is.

Comment: Slippery slope isn't it? It appears the definitions as set forth in this proposed revision are in need of further clarification and agreement before final implementation.

Comment: We believe that this definition is not needed and should be deleted. It is the same meaning as Primer (2.11) and is therefore a redundant definition.

Comment: Eliminate definition.

Response: Green Seal agrees and has combined the definition for "Primer" and "Undercoat". In addition, for clarification, Green Seal has modified the definition for "Paint" and added a definition for "Coating". Green Seal does not believe that a separate definition for "Intercoat" is needed as it does not have relevance in terms of the standard. The definition for "Primer or Undercoat" has been modified from the suggestion and now reads as follows:

Primer or Undercoat: Coating that is formulated and recommended for one or more of the following purposes: to provide a firm bond between the substrate and a subsequent coating; to prevent a subsequent coating from being absorbed into the substrate; to prevent harm to a subsequent coating from materials in the substrate or to provide a smooth surface for application of a subsequent coating.

2.20. Volatile Aromatic Compound: Any hydrocarbon compound containing one or more 6-carbon benzene rings in the molecular structure with an initial boiling point lower than or equal to 250°C measured at standard conditions of pressure.

Comment: Is there a source reference here like you have included in 2.21 VOC? (40 CFR, etc.?)

Comment: We believe that this definition should be the following:
"Any hydrocarbon compound containing one or more 6-carbon benzene rings in the molecular structure with an initial boiling point lower than or equal to 250°C measured at standard conditions of temperature and pressure."

Response: There is no reference listed since aromaticity of a substance can be determined by examining the molecular structure of a chemical to see if it contains one or more 6-carbon benzene rings. Green Seal accepts the proposed definition change. The definition now is as follows:

Volatile Aromatic Compound: Any hydrocarbon compound containing one or more 6-carbon benzene rings in the molecular structure with an initial boiling point lower than or equal to 250°C measured at standard conditions of temperature and pressure.

2.21. Volatile Organic Compound (VOC): Any organic compound which participates in atmospheric photochemical reactions as defined by U.S. Environmental Protection Agency in 40 CFR §51.100 (s), (s) (1) and/or has an initial boiling point lower than or equal to 250°C measured at standard conditions of pressure.

Comment: According to the California Air Resouce Board (CARB) the VOCs (95.1 tons per day) from architectual paint is only 0.40% of the total Reactive Organic Gases (ROGs) released in California every day. Lowering VOCs was meant to reduce low level ozone depletion and urban smog which it has to a small degree. However, applying cool coatings to roofs and walls can make a significantly higher impact on reducing ground level ozone and smog. Having a low VOC polymer with NIR technology can reduce ozone depletion and smog two ways: (1) less solvent to form a film means less VOCs going into the atmopshere (2) cooler walls means fewer fossil fuels are being burned by Utility companies to operate air conditioning systems. Fossil fuels emit greenhouse gases which contributes to global warming. They also react with moisture and heat in the atmosphere to deplete ozone levels and create smog. Low VOC polymers with NIR technology can help reduce Urban Heat Islands.

Response: Green Seal agrees with the comments and acknowledges that there are other significant sources of VOC that contribute to smog and ozone depletion other than VOCs from paint. Green Seal intends to include reflective coatings in the scope of the standard due to the importance of this product category in terms of impacts on energy efficiency and global climate change.

Comment: There's no denying that reducing VOCs has been good for the environment. But there are some additional problems. It makes little sense having low VOCs if the finished coating doesn't last very long and you have to recoat within a few years. Recoating means more VOCs are emitted into the air. Worse still, the energy required to recoat a surface causes a maximum negative effect on the environment, because energy is wasted on fuel for vehicles, spray rigs power washers and other items. The amount of energy used to process polymers from petroleum and pigments is huge. TiO2 is cooked in gigantic furnaces which requires enormous amounts of energy to bake. This contributes to greenhouse gases and global warming. It's unfortunate that many retail paint manufacturers hide behind low VOCs as their only green feature, because in reality if their coatings do not last very long, which most don't, they are causing more environmental damage in the long run. Consumers are being duped because they think low VOCs is helping protect the environment, when in reality this is often not the case.

Response: Green Seal agrees with the comments that in addition to low VOC levels, product performance, energy-consumption in manufacture and raw material extraction are all important concerns for the environmental impacts of a product. Green Seal takes a life-cycle approach to the development of the standard and in addition to VOC limits, includes performance criteria to address issues of product durability. Green Seal is also proposing to prohibit established lists of chemicals to discourage the use of hazardous chemicals in the final product as well as the human health and environmental impacts associated with the use of these chemicals in extraction, production and transport. The intent of Green Seal standards is to reward companies that demonstrate leadership in their commitments to sustainability. In addition to the criteria listed in the standard, the Addendum section adds recognition of leadership initiatives in areas such as zero-VOCs, renewable energy, zero-waste production and alternative energy transport.

Comment: This definition seems to incorporate the European definition of VOC, which we do not believe is appropriate (nor applicable) for a US standard. The US definition of VOC should be used. Therefore we recommend omitting “and/or has an initial boiling point lower than or equal to 250C measured at standard conditions of pressure.”

Comment: The "and/or" should be changed to "and". As written, this definition would exclude the use of exempt solvents. The intent should be to consider materials with a boiling point of >250 degree C to be a non-VOC.

Response: The definition of VOC as given by the U.S. EPA, which was cited by the original GS-11 addresses only VOC in terms of smog production potential and does not properly address indoor air quality. EPA's Method 24 has historically been the method for testing for VOC limits, but even EPA admits to the shortcoming of the methodology. For this reason, gas chromatography/mass spectrometer tests like ASTM D6886 and ISO 11890-2 have been proposed as better ways to determine VOCs, which separate compounds according to boiling point and is a more accurate determination of VOC particularly given lower VOC levels, which are increasingly possible with advances in chemical formulation. Maintaining the U.S. EPA definition in terms of smog production potential would not be consistent with the newer methodology cited in the "VOC Limit" section; therefore, Green Seal has chosen to adopt the European definition in favor of the U.S. definition as it is consistent with advancements in chemical formulation and VOC determination and it is a more preventative approach in line with Green Seal's overall mission. Green Seal agrees with the proposed change. The definition now reads as follows:

Volatile Organic Compound (VOC): Any organic compound which participates in atmospheric photochemical reactions as defined by U.S. Environmental Protection Agency in 40 CFR §51.100 (s), (s) (1) and has an initial boiling point lower than or equal to 250°C measured at standard conditions of temperature and pressure.

3.0 Performance Requirements

Comment: 3. Product-Specific Performance Requirements
[---] recommends that the GS-11 performance requirements are adequate and should not be changed at this time.

Response: Green Seal believes in order to be at leadership levels, the performance requirements in the original GS-11 should be expanded, but has removed the statement that performance requirements shall include colorant to prevent requiring substantial additional testing since manufacturers do not routinely conducting performance tests with colorants added.

3.1 All paints and coatings under GS-11 shall meet the following performance requirements unless specified otherwise. All applicable performance requirements shall include the paint or coating with colorant.

Comment: Please consider commentary as supplied by [---] on all product specific performance requirements. Again, one size simply does not fit all in the paint and coatings world.

Comment: The standards given in section 3.1 are not relevant to epoxy or urethane coatings or flooring systems on concrete. Even more relevant, these performance criteria may be relevant to latex, but are not relevant or applicable to any paint or coating on concrete.

Response: The performance requirements given in Section 3.1 for All Paints and Coatings includes criteria that Green Seal believes is appropriate to paints and coatings within the scope of the standard. High performing industrial products such as those that are factory-applied or original equipment manufacturer (OEM) coatings that would require significantly higher levels of performance are not included in the scope of the standard. Green Seal has removed the reference to colorants as performance requirements are not typically conducted with colorants added. Green Seal recognizes that adding a high amount of colorant can modify performance requirements but believes it is the responsibility of the manufacturer to determine adequate performance requirements of products with colorants added. In addition, Green Seal has determined that the

performance requirements for Reflective Coatings can be addressed separately due to the inclusive nature of ASTM 6083 and are no longer included in the All Paints and Coatings section.

Paints and Coatings. All paints and coatings, except reflective coatings, shall meet the following performance requirements unless specified otherwise.

3.1.1. Adhesion. The product shall demonstrate a minimum of 50% or better rating for wet and dry adhesion over wood, masonry, aged alkyd and vinyl as determined by ASTM D3359-2 Standard Test Methods for Measuring Adhesion by Tape Test.

Comment: All coatings are not formulated to have adhesion over all substrates, If Green Seal wishes to break up physical properties as well as other requirements based on the type and function of the coating being tested, then adhesion must also be broken up.

Comment: I agree with [---] and [---] that the adhesion requirements will change depending on the substrate the coating is applied over. As it is currently written, metal is excluded as a substrate from the standard, when many coatings are formulated specifically to go direct-to-metal.

Comment: It is simply not realistic to enforce an adhesion test for all paints on all of the surfaces specified. In fact, most coatings will show adequate adhesion on wood, masonry and aged alkyd. However, adhesion to vinyl must be designed into the coating and most trade sales wall paints would not have adhesion to vinyl, particularly wet adhesion. Even masonry would pose a problem with adhesion in the case of a relatively new masonry substrate which would have a pH in excess of 9 or even as high as 11 on the standard 1 to 14 scale.

Comment: This is an unrealistic expectation and greatly limits the types of technologies employed in the development of coatings. The types of substrates are not clearly defined (i.e. type of wood, and age of alkyd) and would allow for extreme variations in adhesion results.

Comment: Why would an anti-corrosive paint have to meet the requirement of adhesion to wood and vinyl? As I understand how this is written, all paints must meet the adhesion requirements and anti-corrosive paints must meet these plus corrosion resistance. Anti-corrosive paints a specifically formulated to adhere to metals and cleaned rusted surfaces. Each surface must be considered when formulating a paint.

Comment: Rust Preventative Coatings – the requirement for adhesion in 3.1 covers wood, masonry, aged alkyd and vinyl and doesn't address metal adhesion. For Rust Preventative coatings, that same method – D3359-2 – can be used but should specify the test be run on the intended metal – steel, galvanized or both.

Comment: It seems this proposed requirement is again trying to turn an architectural coating into a "rust preventative coating" and we strongly encourage further discussion of this standard with coatings manufacturers and experts in the field before finalizing.

Comment: First, D3359 cannot be performed on concrete, it is performed on steel (read the scope). Does testing a paint on steel for adhesion have any relevance to testing the same paint on concrete? No!

Response: Green Seal acknowledges the comments and recognizes that adhesion can be determined on a number of substrates. The requirement has been modified and is now as follows:

Adhesion. The product shall demonstrate a minimum of 50% or better rating for wet and dry adhesion over the intended substrate as determined by ASTM D3359-2 Standard Test Methods for Measuring Adhesion by Tape Test.

3.1.2. Applicability (Flow and Leveling). The product shall demonstrate a minimum 6 rating for foaming, leveling, and spatter resistance as determined by ASTM D7073-05 Standard Guide for Application and Evaluation of Brush and Roller Applied Paint Films.

Comment: See 3.1.1 comments. Also, why are coatings that are originally included in 1.0 scope, and typically sprayed on to a substrate, though not necessarily through the use of the excluded aerosol can, subject to an ASTM standard for application of a brush and roller applied paint film?

Comment: We fail to see the connection between quality and or environmental awareness determined from flow and leveling. In addition this particular property as been determined to be of little concern in paints with low sheen (Flats). This property really should only apply to non-flat coatings.

Comment: Again, this seems to be driven by a specific category of the market and may exclude several other categories. Many coatings are spray applied only. Many heavy duty floor coatings are spread on the surface (squeegee and backrolled). This test really doesn't apply for these applications.

Comment: A leveling rating of 6 may be appropriate for a semi-gloss paint that is applied by brush. But would not necessarily be appropriate for high build products that require excellent sag resistance, which would be counter to good leveling properties. Also, some parts of the country like a paint with “stipple”.

Response: Comments received during the Scoping phase suggested the inclusion of Flow and Leveling is an important criterion in determining application properties. Green Seal believes that acceptable application of a product is an important criterion for flat and non-flat wall paints and coatings. Green Seal acknowledges the comments that some coatings may be spray applied. The requirement has been modified to include a separate test method for applicability of spray applied coatings and floor coatings. The requirement is now as follows:

Applicability (Flow and Leveling). The product shall demonstrate applicability by either a minimum 6 rating for foaming, leveling, and spatter resistance as determined by ASTM D7073-05 Standard Guide for Application and Evaluation of Brush and Roller Applied Paint Films or 12-14 minimum drawdown as tested by ASTM D4400-99(2007) Standard Test Method for Sag Resistance of Paints Using a Multinotch Applicator. Floor coatings shall demonstrate a minimum 7 rating as determined by ASTM D4062-99(2003) Standard Test Method for Leveling of Paints by Draw-Down Method.

3.1.3. Flexibility. The product shall show no signs of cracking, peeling or loss of adhesion as determined by ASTM D522-93a (2001) Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings.

Comment: Please consider commentary on this subject from [---].

Comment: This test may be too severe for interior paints.

Comment: Again, this is a broad requirement that may not fit the different product categories, including rust preventative and floor coatings. For some cases, in order to meet the flexibility requirements, several other important performance requirements may have to be sacrificed. For example, there is often a higher PVC value of corrosion resistant primers, which may cause flexibility to decrease. In addition, high elongation in floor coatings may lead to load resistance issues with the floor.

Comment: We do not believe that mandrel flexibility has any correlation to the performance of acrylic, vinyl acrylic and or alkyd paints applied over wallboard, plaster and other stable substrates.

Perhaps this test method is needed for select paint categories and therefore it should be put in these specifically, not as a general rule.

Comment: This is not an appropriate test for an interior paint that is applied to substrates that are not subjected to flexing and/or bending. The substrates these products are applied to are fairly rigid. Also, only a limited number of exterior paint products are required to have flexibility.

Comment: Same with ASTM D522, performed on steel substrates. Flexibility on a concrete floor is not necessarily an advantage, and often a disadvantage for high performance systems. As the industry knows, a system design to accommodate movement at concrete joints is more relevant than flexibility in the core of any floor "paint" on concrete.

Comment: Paints on metal do not need to be as flexible as paints over wood and vinyl surfaces. A harder paint film is often required to give the overall desired effect on metal.

Response: Green Seal acknowledges the comments and has removed Flexibility from performance requirements of All Paints and Coatings. Flexibility of Exterior Topcoats, however, is an important performance criterion with the expansion and contraction of the exterior substrate due to moisture and temperature changes with the outdoor environment.

3.1.4. Temperature Stability. The product shall not thicken, skin, or show any coarse particles as determined by ASTM D1849-95(2003) Standard Test Method for Package Stability of Paint.

Comment: Skinning is not necessarily a function of the paint product. It is also influenced by container choice and headspace. ASTM 1849-95(2003) does not specify container type, size, or headspace.

Response: Green Seal has determined that Temperature Stability is not a key performance criterion and has removed it from the standard.

3.2 In addition to requirements in 3.1, primers and undercoats shall meet the following requirements:
3.2.1. Hiding Power (Opacity). The product shall demonstrate a minimum 0.98 contrast ratio at 400 square feet per gallon as determined by ASTM D2805-96a (2003), Standard Test Method for Hiding Power of Paints by Reflectrometry. Compliance will be determined on dried film of the un-tinted white paint having a minimum 80% reflectance.

Comment: 3.2. Requirements for Primers and Undercoats. We suggest that this section be omitted. We believe there is no need for a separate section on primers and undercoats. Both are covered in 3.2[sic] (paints and coatings).

Comment: Primers and Undercoats really encompass a large number of functional coatings. As such VOC and chemical content are areas that Green Seal should focus on. Hiding power should either remain the same or be converted to a flexible scale based on reflectivity. Furthermore Hiding is ultimately only important in topcoats, as the primers function is to undercoat.

Comment: We suggest that this requirement be moved to section 3.1 and the minimum contrast ration maintained at 0.95 from the existing GS-11 standard.

Comment: A minimum contrast ratio of 0.98 for all primers is not appropriate. This may be appropriate for a high hiding primer, but not for primer/sealer products that are designed to aid in adhesion of topcoats to potentially difficult substrates. Primers/sealers typically are more resin rich, so the level of pigmentation is limited. Therefore, these primers/sealers will have lower hiding power. In addition, some primers/sealers are clears.

Comment: Retain the current section 3.1.2 in the existing standard, which more than adequate. The opacity requirement should apply only to topcoats, not to Primers, Sealers & Undercoaters.

Comment: Why would an anti-corrosive paint need to have the opacity of a white, untinted primer? Does more titanium dioxide equate to better performance, not necessarily.

Comment: For anti-corrosive paints it is the proper selection of the binder along with appropriate anti-corrosive ingredients. There are many anti-corrosive paints that are sold direct to metal and do not require a primer. Metal primers a usually gray or iron oxide red. The reason for these colors are that they have excellent hiding power.

Comment: Vaild points that need consideration. Also consider these concepts in 3.2.1.

Response: Green Seal recognizes that the purpose of primers and undercoats is to provide adhesion or surface preparation for subsequent coatings and have fewer pigments; therefore, Green Seal has readjusted the contrast ratio to 0.95 to be more inclusive to Primers and Undercoats. A contrast ratio of 0.95 is also appropriate for the other product categories. The Anti-Corrosive Paint (GC-3) standard included performance requirements of Hiding Power and specified a contrast ratio of 0.95. Interior and exterior topcoats and floor coatings are all intended to provide opacity and spreadability and should meet the contrast ratio of 0.95 in the Hiding Power requirement. While Hiding Power is an important performance measure, increasing the contrast ratio at 0.98 for other product categories would not provide a significant increase in performance and may not be applicable at that level. Green Seal agrees that a separate category for Primers and Undercoats is not warranted and the Hiding Power requirement can be included in the All Paints and Coatings section and the contrast ratio should be set at 0.95. The requirement now reads:

All Paints and Coatings. All paints and coatings shall meet the following performance requirements unless specified otherwise.

Hiding Power (Opacity). The product shall demonstrate a minimum 0.95 contrast ratio at 400 square feet per gallon as determined by ASTM D2805-96a (2003), Standard Test Method for Hiding Power of Paints by Reflectrometry. Compliance will be determined on dried film of the un-tinted white paint having a minimum 80% reflectance.

3.3 In addition to the requirements listed in 3.1, floor coatings shall meet the following requirements.

Comment: 3.3. Requirements for Floor Coatings. We suggest that this section be omitted. There are no existing standards for floor coatings. Therefore, the relevance of this section is not apparent.

Response: Green Seal believes that since floor coatings are included in the scope of the project that specific performance requirements are needed, despite the fact that no standards currently exist.

3.3.1. Alkali Resistance. The product shall show no signs of lifting, wrinkling, disintegration or more than a slight color change as determined by ASTM D7072-04 Standard Practice for Evaluating Accelerated Efflorescence of Latex Coatings.

Comment: should refer to Masonry coatings only.

Comment: What if the floor is not cementitious? How would this requirement make sense?

Comment: What if the floor coating is not a latex coating as well?

Comment: This is only appropriate for floor coatings used for freshly poured concrete and similar cementious substrates. Aged concrete, wood, composite material are examples of substrates that do not require alkali resistance.

Response: Green Seal believes that alkali resistance is an important key performance criterion for floor coatings and while readily applicable to masonry or cement substrates due to their basic (high

pH) properties, the test method is intended to test the alkali resistance of the coating and not necessarily the substrate. Therefore, alkali resistance will also test for film integrity and will ensure that the coating does not deform when exposed to basic solutions, regardless of the substrate. While the methodology is specified using a latex coating, any other type of paint such as an alkyd (oil-based) paint could follow comparable methodology and would need to meet the same criteria.

3.3.2. Bond Strength. The product shall demonstrate minimum 300 psi pull-off strength as determined by ASTM D4541-02 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.

Comment: In section 3.3 you refer to D4541, this is not the correct method for adhesion of "paint" to concrete, which is what most floors are made of. The correct method is D7234.

Comment: I have conducted many bond strength tests for thin films on concrete. Many times the results were < 300 PSI, yet the failure was to the concrete not at the coating interface. I feel that this standard is too restrictive and should include the exception I detailled.

Response: Green Seal acknowledges the comments and has determined that a test for Bond Strength is too limiting as it addressed only those floor coatings applied to concrete; therefore, bond strength is not required as key performance criteria for floor coatings and Green Seal has removed the performance requirement from the standard. The intent of including Bond Strength is to determine the Adhesion of the floor coating and is addressed in the Adhesion requirement for All Paints and Coatings.

3.3.3. Impact Resistance. The product shall demonstrate a minimum 6 in-lb as the impact failure end point as determined by ASTM D2794-93(2004) Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

Comment: Impact resistance when tested according to D2794 is again on steel. Regardless, 6 in lb is a joke to any high performance floor system, but is all you are going to get out of a latex. High performance epoxy flooring systems will get 160 in lb.

Comment: Quoting from the referenced test method: "Because of the poor reproducibility of this method, the reporting of inch-pounds (kilogram-metres) in comparing coatings for impact resistance should be restricted to one laboratory. For interlaboratory comparisons, rankings of coatings for impact resistance should be reported." Does Green Seal plan on designating one laboratory?

Comment: Impact resistance is primarily a function of the substrate and not the coating. The test is only performed on CRS (metal). Substrates such as wood, fiber cement, etc. are easily damaged at 6 lbs.

Response: Green Seal agrees that impact resistance is substrate-dependent and Impact Resistance is not a key performance criterion. Green Seal has removed the performance requirement from the standard.

3.3.4. Scrubbability (Abrasion Resistance). The product shall demonstrate a wear index of 200 or less as determined by ASTM D4060-07, Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.

Comment: For Abrasion resistance, wear index of 200 is not sufficient for a high performance floor system which is always below 100 (epoxy), and often below 30 (urethanes).

Comment: Please refer to comments presented by collective [---] response for this and all other proposed performance requirements.

Comment: Green Seal needs to specify the type of wheel (No. CS-10 or No. CS-17) to be used in the test.
Green Seal needs to specify the number of cycles to be tested
Green Seal needs to specify the film thickness of the coating

Response: Green Seal believes that Abrasion Resistance is an important criterion in determining product performance and long term durability for a floor coating since floor coatings will be exposed to high degree of wear and tear from traffic. While Green Seal recognizes that two types of wheels can be used in the test, Green Seal does not believe it is necessary or pertinent for Green Seal to specify test parameters within the standard. Testing should follow the ASTM methodology and the results of the tests should be reported to Green Seal. High performing industrial products such as those that are factory-applied or original equipment manufacturer (OEM) coatings that would require significantly higher levels of performance are not included in the scope of the standard.

3.4 In addition to requirements in 3.1, reflective coatings shall meet the following requirements:
3.4.1. Solar Reflectance. Solar Reflectance shall meet the requirements as listed below as determined by ASTM E1918-06 Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field.

Characteristic	**Performance Specification**	
	Low-Slope Roofs	Steep-Slope Roofs
Initial Solar Reflectance	Greater than or equal to 0.65	Greater than or equal to 0.25
Maintenance of Solar Reflectance (three years after installation under normal conditions)	Greater than or equal to 0.50	Greater than or equal to 0.15

Comment: The proposed standards GS-11 has in its 3.4.1 Product Specific Performance Requirement is the same as the EPA Energy Star for cool roofs which is a decent benchmark but could be more rigorous. In California, the EPA Energy Star is not used to meet Title 24. The California Energy Commission (CEC) uses the Cool Roof Rating Council (CRRC) heat reflective standards. This submission will cross-list both energy standards.

Proposed Reflective Standards

1) Light Tones: Solar Reflectance 65, Thermal Emittance 75, Solar Reflective Index 70

2) Dark Tones: Solar Reflectance 40, Thermal Emittance 75, Solar Reflective Index 40

Proposed Physical Property Standards

Two Standards: Elastomeric and non elastomeric (latex/thermoplastic)

Elastomeric

A heat reflective coating should follow ASTM D6083 the same specification as the CRRC use for Title 24 in California. Exception: Under table 118-C the old DFT requirement was 20 mils. Even though that DFT has been temporarily placed on hold, DFT is crucial for heat-reflective wall coatings to work. Proposed DFT for this coating standard is 15-18 mils.

Latex/Thermoplastic

Proposed Physical Properties

- Dry Film Thickness (DFT) (this is extremely important to prevent solar absorbance)
- Dirt resistance

- Gloss levels
- Flexibility
- Hide
- Alkali Resistance
- Adhesion
- Accelerated Weathering

Testing Laboratories

Momentum Technologies, Inc.
1507 Boettler Road
Uniontown, OH 44685

PRI Construction Materials Technologies, LLC
6408 Badger Drive
Tampa, FL 33610-2004

R&D Services, Inc.
102 Mill Drive
Cookeville, Tennessee 38501

Underwriters Laboratories, Inc. (UL)
333 Pfingsten Road
Northbrook, IL 60062

Comment: There needs to be two reflective standards: one for dark tones and the other for lighter tones. I'm suggesting the following...
1) Dark tones: SR 40, TE 75, SRI 40
2) Light tones: SR 65, TE 75, SRI 65
The lighter the tone with the correct dry film thickness the better protection against solar radiation.

Response: Green Seal acknowledges the comments, but has decided to have a solar reflectance requirement categorized according to slope similar to U.S. EPA Energy Star Cool Roofs program, which was initially launched in 1999. However, unlike the current specifications of Energy Star, Green Seal is including a requirement for thermal emittance since Green Seal believes that maintaining a high level of thermal emittance in conjunction with solar reflectance is crucial in demonstrating product performance. Energy Star has stated intention to revisit the inclusion of thermal emittance in the specification and will begin posting thermal emittance for compliant products as of December 2007. A combination of solar reflectance and thermal emittance is consistent with U.S. Green Building Council (USGBC) LEED program, Cool Roof Rating Council (CRRC) and California's Title 24. While California's Title 24 standard specifies initial solar reflectance of 0.70 and initial thermal emittance of 0.75, it includes an allowance for lower emittance and higher reflectance to achieve equivalent performance. While the USGBC LEED program cites a higher emissivity value (0.90), it is expected to begin utilizing a similar allowance for demonstrating equivalent performance, the solar reflective index. In addition, the method cited by USGBC, ASTM 408, tends to give higher results than the method stated by Green Seal, ASTM 1371. Green Seal has opted to not cite solar reflective index at this time in order to maintain a minimum thermal emittance level, but Green Seal may revisit the inclusion of establishing equivalent performance such as solar reflective index in a future revision. Green Seal appreciates the list of testing laboratories as examples and has selected key performance criteria of Product Specification, Solar Reflectance and Thermal Emittance as listed in the standard. Due to the comprehensive nature of ASTM 6083, reflective coatings are no longer included in the All Paints and Coatings section and Green Seal has changed the header from Water Resistance to Product Specification. Green Seal has added alternate test method ASTM C1549-04, *Standard Test Method for Determination of Solar*

Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer to include industry accepted test methodology. The reflective coating performance requirements for Product Specification and Solar Reflectance now read as follows:

Reflective Coatings. Reflective coatings shall meet the following requirements:

Product Specification. The product shall meet the requirements as tested by ASTM D6083-05e1 Standard Specification for Liquid Applied Acrylic Coating Used in Roofing.

Solar Reflectance. Solar Reflectance shall meet the requirements as listed below as determined by ASTM C1549-04 Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer or ASTM E1918-06 Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field.

Characteristic	*Performance Specification*[1]	
	Low-Slope Roofs	*Steep-Slope Roofs*
Initial Solar Reflectance	*Greater than or equal to 0.65*	*Greater than or equal to 0.25*
Maintenance of Solar Reflectance	*Greater than or equal to 0.50 (three years after installation under normal conditions)*	*Greater than or equal to 0.15 (three years after installation under normal conditions)*

Comment: Heat reflective coatings is a good solution for lowering the exterior and interior surface temperatures of buildings. If not enough energy-efficient products are introduced to the market place, the world will be forced to convert to nuclear power which we know what the consequences will be. When Oakridge National Labs did their two-year study into reflective wall coatings, they found the lowest saving in cooling to be 4.2% in Miami, Florida. Even at the worst case scenario, if millions of homes had reflective wall coatings and only saved 4.2% on their utility bills the saving in greenhouse gases, global warming and fuel conservation would be astronomical. The highest saving were found in Southern California at 21.99%. If a property has it walls and roofs coated with reflective paint, then depending on the orientation of the sun, geography and other viariables it can expect to save more than 50-60% on it's cooling costs during summer.

Comment: One more important thing needs to be said about energy-efficiency. PG&E estimate that every home emits about 10,600 pounds of CO2 every year to run electrical supplies. If you half that for heating and cooling you get 5,300 lbs of CO2 and if you half that again to get the estimated CO2 usage for cooling it comes out to approximately 2,650 lbs of CO2. The DOE at ORNL did a two-year study into reflective wall coatings and found that in Southern California a home could cut cooling costs over summer by 21.9% if using reflective wall coatings. If you divide that by 2,650 lbs of CO2 you get a savings of more than 500 lbs of CO2. If you times that estimated number by millions of homes the reduction in CO2 emissions is astronomical and would far exceed the 95.1 tons of architectural paint VOC emitted everyday within California. And the coating stats compound every year, whereas a paint job is a one-off occurrence.

Response: Green Seal acknowledges the comments.

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1 Low-slope roofs are surfaces with a slope of 2:12 inches or less and Steep-slope roofs are surfaces with a slope of greater than 2:12 inches as determined by ASTM E1918-06 *Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field.*

3.4.2. Thermal Emittance. The product shall have a thermal emittance of 80% or more as determined by ASTM C1371-04a Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.

Comment: This standard looks good

Comment: We feel that this requirement is redundant, and is determined by the substrate and the ultimate reflectance of the coating.

Response: Green Seal believes the thermal emittance criterion is not redundant as the performance of the product is dependent on a combination of solar reflectance and thermal emittance properties. The combination of solar reflectance and thermal emittance is used by the USGBC LEED program, Cool Roof Rating Council and California's Title 24 specification. While thermal emittance is not a current criterion of Energy Star Cool Roof program, Energy Star will begin posting thermal emittance for products as of December 2007 and Energy Star has stated intention to revisit the inclusion of thermal emittance in the specification. No change has been made.

3.4.3. Fade Resistance. The product shall demonstrate a minimum durability (lack of color change) of 1000 hours using a Xenon Arc or QUV-A bulbs with a moisture and/or condensation cycle following the guidelines in ASTM G151-06 Standard Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Source or ASTM G155-05a Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials.

Comment: Minimum durability is not defined.

Response: After further research, Green Seal has determined that Fade Resistance is not a key performance criterion for reflective coatings and has removed the performance criteria from the section.

3.4.4. Water Resistance. The product shall show no signs of washing off, lifting or wrinkling as tested by ASTM D1735-04 Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus.

Comment: ASTM D-1735-04 is not stringent enough for a liquid applied roof coating. The accepted test method is D6083-05 – Standard Specification for Liquid Applied Acrylic Coating used in Roofing. This method specifies a Water swelling test (D471) along with a Permeance test (D1653).

Response: Green Seal agrees and has accepted the proposed revision. ASTM D-6083 is a comprehensive standard for roof coatings that lists criteria requirements and corresponding ASTM tests for the following: Viscosity, Weight Solids, Volume Solids, Elongation, Low Temperature Flexibility, Accelerated Weathering, Tensile Strength, Adhesion, Tear Resistance, Permeance, Water Swelling and Fungi Resistance. As such, the performance requirement of All Paints and Coating no longer includes Reflective Coatings.

3.5 In addition to requirements in 3.1, rust preventative coatings shall meet the following requirements:
3.5.1. Corrosion Resistance. The product shall have a minimum rust rating of 9 per SSPC-VIS 2 after 300 hours of exposure as determined by ASTM D5894-05 Standard Practice for Cyclic Salt Fog/UV Exposure of Painted Metal, (Alternating Exposures in a Fog/Dry Cabinet and a UV/Condensation Cabinet).

Comment: Change "rust preventative coatings" to "anti-corrosive coatings" or "corrosion-inhibiting coatings."

Response: Green Seal acknowledges the comments and has made the following changes: "Rust preventative coatings" has been changed to "anti-corrosive coatings". The requirement for anti-corrosive coatings now reads as follows:

In addition to requirements in 3.1, anti-corrosive coatings shall meet the following requirements:

Corrosion Resistance. The product shall have a minimum rust rating of 9 per SSPC-VIS 2 after 300 hours of exposure as determined by ASTM D5894-05 Standard Practice for Cyclic Salt Fog/UV Exposure of Painted Metal, (Alternating Exposures in a Fog/Dry Cabinet and a UV/Condensation Cabinet).

3.6 In addition to the requirements listed in 3.1 and 3.2, interior topcoats shall meet the following requirements.

3.6.1. Scrubbability (Abrasion Resistance). The product shall demonstrate the following minimum requirements for scrub cycles before failure as determined by ASTM D2486-06 Standard Test Method for Scrub Resistance of Interior Latex Flat Wall Paints.

Flat	1000 scrub cycles before failure
Non-Flat	1500 scrub cycles before failure

Comment: For section 3.6, most epoxy and urethane coatings are barely scratched at 1500 cycles of D2486 scrub testing, the point at which a good latex paint will begin to fail.

Comment: What if my paint is not a flat? Would the same standard apply? If a paint has excellent stain resistance, there is no need to have high scrub resistance.

Comment: What is the intent behind 1000 cycles. This establishes a performance standard that exceeds reasonable performance needs. IF your performance criteria for raw material selection were appropriately strict for a green profile, I think that you would be reassessing many of your application and use criteria and relaxing them a bit. Your spec appears to be taking current product performance which may or may not be relevant, rather than more seriously considering leadership in the environmental impact of raw material streams. I think you are missing an important opportunity here, and if you are to be the certifying agent for LEED, this seems inappropriate, as the goal is a COMBINATION of environmental and performance criteria.

Comment: 1,000 for both flat and non-flat paints.

Comment: The proposed requirements are too stringent and should be changed to those below. Scrub resistance is just one measure of a coatings quality and the level of scrub resistance proposed would eliminate some quality paints. Flat paints – 500 cycles, Non-flat paints – 1000 cycles

Comment: As the restrictions on permissible level of VOC in coatings continue to increase, it is becoming more important that polymers used in formulations can be used at low or zero solvent levels, without sacrificing much in product properties and performance. In order to obtain the optimum properties and maintain the characteristics of regular products , without or with very low levels of coalescing solvents, formulations have to be modified or built from ground and the new generation emulsions used in the formulas have to be soft and low temperature film forming polymers; reasons enough to lead to lower scrub cycles. Even though this aspect could be improved to a certain extent by using internally self-cross linked polymers, we know by experience that even this approach does not overcome the short fall totally. As a rule of thumb, high scrub resistance paints are easily achievable by using harder polymers that require significant levels of coalescing solvents, which in return would contradict with current day VOC limitations. Considering the complexity of formulating low or zero VOC products with present day technology and maintain the properties of conventional latex products including the freeze-thaw stability (essential for our climate), we find the proposed scrub cycles unnecessarily high and unrealistic, especially when many paint companies recommend to use soft and damp cloth and mild detergents without abrasive media, to remove dirt and smudge from household walls.

We suggest reviewing the current proposal, as we believe it should apply more to heavy duty coatings rather than DIY or architectural paints.

Comment: These requirements are not unreasonable for typical interior wall paint expectations, but it they may not apply to direct to metal maintenance coatings. Outside of architectural coatings, other segments of the market do not require the same performance characteristics.

Comment: The increased scrub values are unrealistic. Increasing the scrub resistance from 200 to 1000 for interior flats will eliminate any higher PVC flats that are typically used in new construction.

Comment: The proposed scrub cycles are unrealistic based on the limitations of the test. The test has a repeatability value of 30% (one operator) and its reproducibility is 58% (two operators in different labs).

Comment: The test method referenced may be performed with or without a "shim" (added weight). The number of scrub cycles specified in this section may be appropriate when the test is conducted without a shim, although use of the shim is the more common procedure. The number of cycles should be reduced accordingly to 400 cycles and 700 cycles for Flat and Non-Flat Coatings respectively.

Comment: The proposed abrasion resistant requirements as listed below and based on the ASTM D2486-06 Standard Test Method, is too aggressive and unrealistic.
Interior
Flat—1000 scrub cycles before failure
Non-Flat—1500 scrub cycles before failure

Increasing the scrub resistance requirements from 200 to 1000 for interior flats will eliminate any high PVC flat coatings that are typically used for new construction. In addition, scrub resistance requirements of 2500 cycles for exterior flats at 50 g/L VOC is not feasible for acrylic based paints. The performance requirements for adhesion and alkali resistance would preclude the use of high-scrub vinyl-acrylics and vinyl-acetate-ethylene.

Response: Green Seal acknowledges the comments and recognizes that the standard is a combination of both environmental and performance requirements. Performance criteria are not meant to distinguish the highest performing products but to establish adequate product performance that may be compromised given the environmental and human health criteria. High performing industrial products such as those that are factory-applied or original equipment manufacturer (OEM) coatings that require additional considerations due to significantly higher performance requirements are not included in the scope of the standard. Given the other necessary environmental and human health considerations and the current advances in the industry, Green Seal agrees that the requirement of 1000 scrubs before failure for flat and 1500 scrubs before failure for non-flat are too stringent. However, Green Seal believes that scrubbability is necessary to establish the durability and ultimately the life-cycle impact of a coating. Green Seal has accepted that the suggested levels of 400 scrubs before failure for flat and 700 for non-flat are appropriate levels to ensure high quality paint. The methodology of ASTM D2486 should be followed for both flat and non-flat paints. Products with high stain resistance should be able to demonstrate compliance with the Scrubbability requirement. While Green Seal acknowledges that there are limitations to the ASTM method stated, the scrubbability method has been used since the original Paint standard in 1993 and operator and laboratory interdifferences have not been a limiting factor in currently certified products. The requirement now reads as follows:

Scrubbability (Abrasion Resistance). The product shall demonstrate the following minimum requirements for scrub cycles before failure as determined by ASTM D2486-06 Standard Test Method for Scrub Resistance of Interior Latex Flat Wall Paints.

Flat Topcoats	*400 scrub cycles before failure*
Non-Flat Topcoats	*700 scrub cycles before failure*

3.6.2. Washability (Stain Removal). The product shall demonstrate the following minimum requirements for stain removal as determined by ASTM 4828-91 Mechanical Method, Standard Test Method for Practical Washability of Organic Coatings.

Flat	5 minimum rating
Non-Flat	7 minimum rating

Comment: Same with the washability, latex paints are not even in the same ballpark as epoxies and urethanes.

Comment: See comments on 3.6.1.
Comment under 3.6.1: "These requirements are not unreasonable for typical interior wall paint expectations, but it they may not apply to direct to metal maintenance coatings. Outside of architectural coatings, other segments of the market do not require the same performance characteristics."

Response: Green Seal acknowledges the comments, but the purpose of the performance requirements is to establish key performance criteria for typical interior wall paints and Green Seal believes that Washability (Stain Removal) is an important performance requirement for interior topcoats. High performing industrial products such as those that are factory-applied or original equipment manufacturer (OEM) coatings that require additional considerations due to significantly higher performance requirements are not included in the scope in the standard. No change has been made.

3.7 In addition to the requirements listed in 3.1 and 3.2, exterior topcoats shall meet the following requirements.

3.7.1. Biological Growth. The product shall attain a surface disfigurement rating of 8 or greater when exposed to a biological test chamber following the requirements of ASTM D3273, Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber and evaluated according to the requirements of ASTM D 3274, Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Microbial (Fungal or Algal) Growth or Soil and Dirt Accumulation.

Comment: The method called for is used evaluate interior coatings. Secondarily this test method is a very poor predictor of actual exterior durability and in some cases actually indicates poor performance of paints that are excellent for exterior performance and conversely indicates good performance for materials that fail dramatically when actually exposed.

Comment: ASTM D5589 (Algal growth) and D5590 (Fungal growth) are more commonly used to determine the coatings resistance to biological growth. In additional to these laboratory tests, exterior exposure is always recommended as the final determination of microbial resistance.

Comment: You also need to use the right biocide package. [---] have a broad spectrum system which contains algaecide, fungicides and mildewcides. Dirty coatings lower the surface albedo which inhibits solar reflectance. In Australia and New Zealand, biocides are important but so is the MMF or TG of the coating. High MMF or TG generally gives you an indication of dirt resistance.

Response: Green Seal agrees and admits that the test is specified for interior coatings, as it is difficult, if not impossible to properly simulate exterior conditions. While the best indicator of the performance of an exterior coating is real-life product performance, Green Seal believes that some determination of biological growth is necessary for the known performance of an exterior

coating. Green Seal accepts the proposed alternate methodology and the performance requirement for biological growth is now as follows:

Biological Growth. The product shall attain a surface disfigurement rating of 8 or greater as determined by ASTM D5589-97(2002) Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Algal Defacement and ASTM D5590-00(2005) Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay or ASTM D3273-00(2005) Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

3.7.2. Alkali Resistance. The product shall show no signs of lifting, wrinkling, disintegration or more than a slight color change as described in 3.3.1.

Comment: Should only be used for paint systems intended for Masonry.

Comment: This is only an appropriate test requirement for freshly poured or cured concrete, masonry, and similar cementious substrates. Aged concrete, masonry, wood, composite material, etc. for example do not need to be alkali resistant to obtain good exterior performance and durability.

Response: Green Seal agrees though alkali resistance is important for determining the film integrity and not necessarily the application on a certain substrate, alkali resistance is not a key performance criterion for Exterior Topcoats and Green Seal has removed the performance requirement.

3.7.3. Fade Resistance. The product shall demonstrate a minimum durability (lack of color change) of 1000 hours as described in 3.5.3.

Comment: We suggest this section be omitted. The standard as written does not specify a color or pigment type.

Comment: Minimum durability is not defined.

Response: Green Seal believes that a test for Fade Resistance is an important criterion for an exterior paint or coating. While the method may have limitations, Green Seal believes that the ability of the methodology to determine fade resistance of a paint or coating is an adequate measure at this time and it is not necessary for Green Seal to specify the color or pigment type as there will be a wide variation in product types. Green Seal has added a minimum requirement. The requirement now reads as follows:

Fade Resistance. The product shall demonstrate a minimum durability (color change <1) of 1000 hours using a Xenon Arc or QUV-A bulbs with a moisture and/or condensation cycle following the guidelines in ASTM G151-06 Standard Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Source or ASTM G155-05a Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials.

3.7.5. Scrubbability (Abrasion Resistance). The product shall demonstrate the minimum 2500 scrub cycles before failure as described in Section 3.6.1.

Comment: Scrubs for exterior paints are not a good indicators for life cycle analysis. The industry as well as third party laboratories that conduct physical properties testing on paints rarely if ever include this as an exterior test criteria. It is common to see paints with fewer than 100 cycles perform excellently for years in actual exposures.

Comment: Scrub resistance is generally not specified for exterior paints. While it can be used as a measure of an integral paint film, adhesion, flexibility, water resistance and UV resistance are much more important given the stresses that exterior paints endure. 250 cycles maximum is more reasonable.

Comment: With respect to Green Seal, what use is a scrub test when an exterior wall coating is only specified at 1.4-1.8 DFT mils in two coats? At such a low film build solar energy will be absorbed through the film. That's why many exterior wall coatings do not last long in hot climates.

Comment: A scrub resistance value of 2500 for exterior flats at 50 g/L is not feasible for acrylic based paints. The performance requirements for adhesion and alkali resistance would preclude the use of high-scrub vinyl-acrylics and vinyl-acetate-ethylene polymers. In addition, scrub resistance is not considered to be a real-world determination of exterior paint quality.

Comment: This is not an appropriate requirement for exterior coatings. Exterior coatings are designed to be softer and have higher flexibility to withstand temperature cycling and environmental exposure. The ASTM method referenced is designed for interior not exterior products. It would be more appropriate to have a practical washing test (section 3.7.6) or rely on the other exterior requirements listed as an indicator of exterior coating durability.

Comment: Scrubbability (Abrasion Resistance) and Washability (Stain Removal) are not generally meaningful properties of exterior coatings, and high degrees of scrubbability and washability may be achieved only at the sacrifice of more meaningful properties. An additional test for Gloss Retention should be added instead.

Comment: The proposed abrasion resistant requirements as listed below and based on the ASTM D2486-06 Standard Test Method, is too aggressive and unrealistic.
Exterior
Topcoats—2500 scrub cycles before failure

Response: Green Seal acknowledges the comments and has determined that Scrubbability is not a key performance criterion for Exterior Topcoats and has removed the criterion from the standard. The intent for including Scrubbability is to determine film integrity, which Green Seal believes is adequately addressed with other performance criteria including Flexibility, Fade Resistance and Water Resistance.

3.7.6. Washability (Stain Removal). The product shall demonstrate the minimum requirements as described in 3.6.2.

Comment: This test measures resistance to interior stains (lipstick, mustard, crayon, etc) Dirt pick up would be more appropriate.

Comment: Stain removal is not generally specified for exterior paints.

Comment: The standard as written is not applicable to exterior coatings.

Response: Green Seal agrees that Washability is not a key performance criterion for Exterior Topcoats and has removed the performance requirement.

3.8. Alternative Performance Requirements. Alternatively, a manufacturer can demonstrate that its product meets the performance requirements using alternate standard test methods if accompanied by documented rationale for the method modification.

Comment: "Alternate standard test methods" meaning "non-standard" test methods? Who has the final authority in reviewing these accompanied "rationale for method modification" documents? Will each case be open to peer review for comment, or will each one be reviewed on a case by case situation?

Response: "Alternate standard test methods" is intended to make allowances for additional standard methods or methodology not specifically mentioned in the standard. While standard ASTM test methods are cited, there still remains some variability within the standards themselves. Green Seal believes it is neither necessary nor pertinent for Green Seal to specify the test parameters for every ASTM test and believes by doing so would limit the product performance. The alternate standard test method is intended to allow for ensuring standard methodology while allowing for modification of applicable test parameters if accompanied by supporting documentation to Green Seal. In addition, while every effort has been made to establish the appropriate ASTM standards, there may be applicable ASTM standards either not cited specifically or an alternate established methodology like corresponding test methods by the International Organization of Standards (ISO). The provision is intended to allow for flexibility within the GS-11 standard for these provisions. All methodology that is different than the stated ASTM test method is subject to approval by Green Seal with documented rationale. Any test results from a laboratory (internal or otherwise) that are submitted to Green Seal must be determined to be repeatable and reputable. The requirement has been reworded and now reads as follows:

Alternative Performance Requirements. Alternatively, a product can demonstrate adequate performance through using another scientifically validated test method under controlled and reproducible laboratory conditions. Test methodology must be documented in sufficient detail for Green Seal review.

4.0 Product-Specific Health and Environmental Requirements

4.1. Compound Prohibitions. The product, including colorant, shall not contain any ingredients that are carcinogens, mutagens, reproductive toxins, hazardous air pollutants or ozone-depleting compounds. An exception shall be made for titanium dioxide. Naturally occurring elements and chlorinated organics, which may be present as a result of chlorination of the water supply, are not considered ingredients if the concentrations are below the applicable maximum contaminant levels in the National Primary Drinking Water Standards found in 40 CFR, Part 141.

Comment: Notwithstanding the above, I would elaborate on other specific items in this proposed standard: Many products contain materials on the IARC list that are not used in the form as tested at IARC and otherwise meet OSHA requirements when used in paints. This includes Silica, and carbon black. Silica (the stuff you walk on at the beach) is only a hazard if very, very fine particles are in the air, not in the paint. Concrete has a significant amount of silica, and I see no way that we can build anything without concrete. Is there a silica ban in concrete specs? No! Also Carbon Black, a hazard when in dust form in the air, is used in almost all paint as a colorant where it is always encapsulated and not in the air.

Comment: Seems to me that the general topic of metals in colorants and in other paint solids should be addressed in more explicit detail. Even if dried paint (either by itself as a residue in discarded containers, or as a coating on discarded products) does not typically register as a hazardous waste (via the toxicity characteristic under TCLP), that situation could change if TCLP procedures are ever revised. It's a can of worms, to be sure, but if those interesting metallic constituents are in the paint, they are eventually going to be in the landfills, and the sooner their presence is addressed, the better in the long run. There actually is a kind of an indirect reference in this section -- a number of metal salts show up in EPA's list of HAPs, and the standard would presumably include them in the prohibited list by reference. They include cadmium, chromium, lead, manganese, mercury, and nickel, plus several others (see http://www.epa.gov/ttn/atw/188polls.html for the full list). But is that list the appropriate one to use to set standards for paint solids? It could very well be that, for example, the standards should encourage the use of, say, manganese rather than cadmium to achieve some desired color, since the latter is likely to result in more objectionable consequences than the former in a leachate situation. Rather than that indirect (and unintended?) reference, I'd recommend that this section (or the following one) provide an explicit list of metals to be avoided, supplemented

perhaps with a list of those considered more preferable, when formulating colorants, biocides, and other solid constituents.

See also my comment following 5.2.

Comment: Just about all universal colorants contain gycols which are a VOC. Interestingly, you don't need solvents in most colorants. You get better hide and less surfactant leaching. The only problem is limited colour selection.

Comment: I agree that an explicit list of prohibited unintended and added chemicals, such as biocides and colorants should be included. This will be especially helpful for institutional consumers who are looking to avoid particular hazardous compounds per legislative mandate.

Comment: [---] strongly disagrees with the language in the proposed revision to GS-11, section 4.1. Some key raw materials used today in the manufacture of architectural coatings may contain chemicals of concern in extremely small part per million (ppm) quantities. These items are not added intentionally but are present as unreacted constituents from the raw material manufacturing process. Banning these small ppm quantities will severely restrict the availability of raw materials available to architectural coating manufacturers and will increase the cost of coatings to the end consumer significantly. Some constituents ie. silica, is not available for exposure due to the encapsulating nature of the coating itself. [---] recommends using the following language in the proposed revision to GS-11.

Comment: We strongly believe that the use of peer-reviewed established compound lists would be too prohibitive in the formulation of paint and would result in an environmental standard of little use since few if any coatings manufacturers would be able to comply with the standard.

Comment: Prohibition of substances regardless of exposure potential does not address the actual risk posed by the substance. If a risk assessment demonstrates that exposure to the product in its intended use would not result in exceedance of the California Proposition 65 No Significant Risk Level (NSRL) for carcinogens or the Maximum Allowable Dose Levels (MADL) for reproductive toxins the mere presence of the substance as an ingredient should not eliminate the product from consideration for certification.

Comment: Colorant should be excluded from any mention in this standard, for a variety of compelling reasons that we would be pleased to discuss at length if Green Seal is interested. The exception for titanium dioxide should be extended to crystalline silica and carbon black, because the potential carcinogenic effects of these substances are associated only with airborne respirable dust, as is the case with titanium dioxide. This hazard does not exist when these substances are incorporated into a liquid paint or in a dry paint film.

Response: While some risk assessments have allowed for certain chemicals based on the route of exposure of a product category, Green Seal uses a life-cycle approach; therefore, some chemicals that may not pose a danger to the end user may pose a risk during the production, manufacture or distribution of the material are included in the Compound Prohibition lists. Green Seal admits that using peer-reviewed lists is a more restrictive approach and that not all products will be able to meet the standard, but in development of leadership standards, Green Seal wants to discourage the proliferation of established harmful compounds in the overall industry and encourage innovation towards alternative chemicals. In addition, Green Seal believes in a preventative approach for human health hazards and using established peer-reviewed lists discourages the formulation around the “laundry-list” of chemicals, which may incorporate alternate, but still hazardous materials. Titanium dioxide is allowed as an exception, not due to its route of exposure, but as a widely constituent of paint due to its superior brightness and reflective ability with few safer alternatives that offer the same functionality. Therefore it is due to these considerations and not strictly route of exposure, which serves as the reason Green Seal has made an exception for titanium dioxide. Green Seal will revisit the issue of titanium dioxide

as listed as an IARC 2B, possible carcinogen during the next revision. Other chemicals such as crystalline silica, listed on IARC as carcinogenic to humans when inhaled in occupational circumstances and carbon black, IARC 2B, are prohibited due to their inclusion on the established lists due to their hazards within the production, manufacture, distribution and use of the material and either have acceptable alternatives or are not essential in all paint formulations. In terms of unavoidable and unreacted constituents, the definition of "Ingredient" (0.01% by weight or 100 ppm) is defined for Section 4.1 and serves as a threshold to allow for unavoidable or unreacted trace constituents at levels below 100 ppm in the product. Green Seal acknowledges the comments and agrees that an explicit list of heavy metals should be included. Heavy metals are now listed in the "Specific Compound Prohibitions" section. Additives in the formulation like biocides and colorants added by the manufacturer are not listed separately, as they are considered as part of the whole product formulation and applicable to the prohibited chemicals lists including carcinogens, mutagens, reproductive toxins, ozone-depleting compounds and hazardous air pollutants. These peer-reviewed established lists of prohibited chemicals are available by the respective agencies. Green Seal desires to allow flexibility for innovation and does not include list of preferred chemicals. Green Seal has removed the reference to colorant in this section due to the difficulties and variability with the existing infrastructure to determine the chemical composition of colorants added at the point-of-sale. Green Seal addresses the issue of colorants by adding Colorants Added at the Point-of-Sale VOC Limits. The issue of prohibited chemicals in terms of colorants added at the point-of-sale will be revisited in the next revision. The requirement now reads as follows:

Compound Prohibitions. The product shall not contain any ingredients that are carcinogens, mutagens, reproductive toxins, hazardous air pollutants or ozone-depleting compounds. An exception shall be made for titanium dioxide.[2]

Naturally occurring elements and chlorinated organics, which may be present as a result of chlorination of the water supply, are not considered ingredients if the concentrations are below the applicable maximum contaminant levels in the National Primary Drinking Water Standards found in 40 CFR, Part 141.

4.2. Specific Compound Prohibitions. The product, including colorant, shall not contain the following ingredients:
- ***1,2-dichlorobenzene***
- ***Aqueous ammonia***
- ***Alkylphenol ethoxylates (APEs)***
- ***Formaldehyde-donors***
- ***Phthalates***
- ***Methyl ethyl ketone (MEK)***
- ***Triphenyl tins (TPT) and tributyl tins (TBT)***

Comment: I would like to see the list to include methyl isobutyl ketone and glycol ethers as in the Australian Ecolabel program.
http://www.aela.org.au/standards/GECA 23-2005 - Architectural Coatings.pdf

Response: Glycol ethers and methyl isobutyl ketone are included in the U.S. EPA hazardous air pollutants list and are prohibited under "Compound Prohibitions".

Comment: My question is: Why do you have methyl ethyl ketone (MEK- CAS 78-93-3) on the list of specific compound prohibitions?
The EPA has removed MEK from both its HAPS (hazardous air pollutants) list and the Toxic Release Inventory (TRI) reporting requirements. It is no longer a toxic chemical under these laws.

[2] Titanium Dioxide: EC Number 236-675-5, CAS Number 13463-67-7

Comment: [---] strongly disagrees with the prohibition of MEK and phthalates. MEK, in particular, should not be prohibited since it was removed from the Environmental Protection Agency's HAP list. We also believe that aqueous ammonia should not be prohibited. This is a common ingredient in waterborne paints and is also used in household cleaners. Aqueous ammonia is not hazardous in small concentrations. Finally, with regard to phthalates, we feel that this prohibition covers too broad of a class of products and assumes that all phthalates are equal in toxicity in spite of scientific evidence to the contrary.

Comment: Why would ammonia be prohibited? Ammonia is a very common neutralizing agent used in the manufacture of many, many latexes used for coatings. It is also a very common material to adjust pH of paints. There are alternatives such as amines, NaOH, and KOH. Amines have known hazards and the others will add water sensitivity to the dry paint film, potentially causing problems.

Comment: What justification is cited in requesting the prohibition of aqueous ammonia from paint formulations? What are suggested cost effective environmentally-friendly and non-performance hindering or VOC contributing alternatives?

Comment: Aqueous ammonia should not be banned. There should be an allowance for some ammonia to be used for stabilization of pH. Fixed alkali such as sodium carbonate can lead to water sensitivity and product failure.

Comment: Aqueous Ammonia is listed as an exempt solvent, and should not be included.

Comment: Ammonium hydroxide as a trace level component in some paint ingredients should not be prohibited since it is required for these components to function as intended. Reformulation would be expensive and disruptive at best, and impossible at worst. Trace levels of this substance in paint would not pose a risk to human health or the environment. It is incumbent on any organization that develops product standards to not only consider potential health and environmental effects, but also economic effects and technical feasibility. For this reason as well as the reason given in response to Section 2.5 it is critical that the threshold concentration to be considered an ingredient be increased to 0.1% so as not to eliminate paints that do not pose a risk from consideration for certification.

Comment: Eliminate aqueous ammonia from this list. Aqueous ammonia is used in small amounts as a pH-buffering agent in latex paints, and is less harmful than available alternatives.

Comment: Regarding in store tinting. How can you control content of colorants added to paints at the store level? For example, if I sell my tint base to a hardware store, I have no influence on what the store uses to tint the paints. When you state "shall not contain..." At what concentration? You know that with enough time and money, materials can be identified in less than parts per billion levels.

Comment: I think the idea is you don't add the tints in at the store, you mix them in during manufacturing. This way, you don't add additional gycols into the colorants. The only draw back to this is colour selection; however, considering the paint industry is a major pollution contributor any new controls to improve the environment can only be good.

Comment: So you are saying to limit the consumer choices by producing only pre-tinted paints. Unless every architectural paint in the US were Green Seal certified, the Green Seal paints would be at a disadvantage from all other paints due to fewer available choices. Shelf space is also at an all time premium. Current tint systems with 4 bases can be tinted to over 1000 colors, so I only want to be 50% as competitive, therefore I only have to convince each store to give me space for 500 differant colors of paint on his shelf rather than 4 slots.

Comment: As for all restricted hazardous chemical components, our company has been already proactive in the removal of Alkyl Phenol Ethoxylates from current products including the universal colorants and so far made a significant progress in the elimination process. However for a good number of emulsions and other raw material, as we do not have direct control on their composition, suppliers have been approached and asked to come up with APEO free versions of actual materials within acceptable time limits. As to be expected this process will take some time and will ask for significant lab time on our end for substitution. Important to remember that even slight modifications might change certain parameters in emulsions to effect the characteristics of finished products. We hope this point will be taken into consideration seriously and an extended timetable will be established accordingly.

Response: Green Seal has evaluated the scientific evidence and based on information provided to the U.S. EPA that methyl ethyl ketone should be delisted as a hazardous air pollutant and from the toxic release inventory, Green Seal agrees with the decision of the U.S. EPA and has removed methyl ethyl ketone (MEK) from its specific prohibited chemicals list. While Green Seal's intent is to decrease the use of potentially hazardous materials in any part of the raw material supply chain and aqueous ammonia poses an odor and gaseous ammonia presents inhalation hazards, Green Seal understands there are no feasible alternatives at this time and has removed aqueous ammonia from the list of prohibited chemicals. Green Seal will revisit the aqueous ammonia prohibition in the future revision. Green Seal did not intend to imply that all phthalates are equal in toxicity, but due to issues of human health and environmental concerns and few instances of phthalates used in paint formulations in Green Seal-certified products, Green Seal has elected to prohibit the class of phthalates. Colorants added by the manufacturer will be considered within the materials audit as part of the formulation, but Green Seal acknowledges the current complications with the inclusion of colorants added at the point-of-sale given the current infrastructure and has removed the reference to colorants in this section. Green Seal addresses the issue of colorants added at the point-of-sale by adding Colorants Added at the Point-of-Sale VOC Limits. Green Seal does not intent to limit consumer choices, but wants to promote environmental-responsible products by discouraging the use of hazardous substances to a feasible degree given the current infrastructure. Specific compound prohibitions including alkylphenol ethoxylates (APE's) and glycols for colorants added at the point-of-sale will be revisited in the future revision. The statement "shall not contain…" used in the standard refers to the definition of ingredient defined as >0.01% by weight of the product (or 100ppm). Green Seal has also added an explicit prohibition of Heavy Metals as per comments in the "Specific Compound Prohibitions" section. The specific compound prohibitions are now listed as follows**:**

Specific Compound Prohibitions. The product shall not contain the following ingredients:
• 1,2-dichlorobenzene
• Alkylphenol ethoxylates (APEs)
• Formaldehyde-donors
• Phthalates
• Heavy metals, including but not limited to lead, hexavalent chromium, antimony, chromium, mercury or selenium both in the elemental form or compounds
• Triphenyl tins (TPT) and tributyl tins (TBT)

4.3. Volatile Aromatic Compound Content Limit. The product, including colorant, shall contain no more than 0.5% by weight of sum total of volatile aromatic compounds.

Comment: 4.0 Product-Specific Health And Environmental Requirements
[---] suggests that the current VOC content and aromatic compound limits are adequate and should not be modified at this time.

Comment: Eliminate reference to colorant in this section.

Comment: In addition, for latex emulsions, only the volatile free monomers should be considered for aromatic content. Aromatic polymer latex emulsions should be excluded from the aromatic restriction since the aromatic component is a part of the polymer backbone and stays in the film. Thus, the presence of an aromatic polymer does not harm the environment nor human health.

Thus, we recommend this following statement be included as section 4.1.2.:
"4.1.2. Aromatic Compounds. The product must contain no more than 1.0% by weight of the sum total of volatile aromatic compounds. Testing for the concentration of these compounds will be performed if they are determined to be present in the product during a materials audit."

Response: The standard as written is meant to exclude aromatic polymer latex emulsions contained within the binder and in contrast to the original GS-11 has added the descriptor, "volatile". "Volatile Aromatic Compounds" are defined in the Definitions section which includes volatility as determined by boiling point. Given the more specific definition of aromatic compound, Green Seal believes the limit of volatile organic compounds can be lowered from 1.0% to 0.5% in order to be more protective of human health and environmental impacts. Green Seal agrees and due to the complexity of the colorants within the paint industry has removed the reference to colorant for this section. Green Seal accepts the proposed changes and the requirement is now as follows:

Volatile Aromatic Compound Content Limit. The product shall contain no more than 0.5% by weight of sum total of volatile aromatic compounds. Testing for the concentration of these compounds will be performed if they are determined to be present in the product during a materials audit.

4.4. Volatile Organic Compound Content Limit. The VOC concentration of the product shall not exceed those listed below in grams of VOC per liter of product as determined by ASTM D6886-03 Standard Test Method for Speciation of the Volatile Organic Compounds (VOCs) in Low VOC Content Waterborne Air-Dry Coatings by Gas Chromatography. U.S. EPA Reference Method 24 should be used for VOC levels greater than 15%.

The calculation of VOC shall exclude water, but will include colorants.

Product Type	**VOC level in g/L**
Flat Topcoats	50
Non-Flat Topcoats	100
Primer or Undercoat	50
Floor or Reflective Coating	100
Anti-Corrosive Coating	250

Comment: Volatile Organic Compounds (VOC's)

(a) Existing GS-11 VOC standards were written in good faith, but are often not very difficult to meet. Master Painters Institute (MPI) specifications 10 and 11 shows that 26 manufacturers and 45 coatings would meet GS-11 exterior flat coating VOC requirement, while 26 manufacturers and up to 33 coatings meet GS-11 exterior non-flat requirement. In California, many standard water-based paints currently meet GS-11 VOC standards yet are not affiliated with GS-11 and definitely not green.

http://www.specifypaint.com/APL/paintinfo_APL/MpiNumber.asp?ID=10000

http://www.specifypaint.com/APL/paintinfo_APL/MpiNumber.asp?ID=11000

(b) Lowering VOC levels has been a positive step forward in lowering ground level ozone depletion and urban smog. Without intervention from the South Coast Air Quality Management

District (SCAQMD) and other air quality organizations, manufacturers would have continued producing high VOC solvent-based coatings. The SCAQMD should be congratulated for this. However, lowering architectural paint VOC's has not made as big of an environmental impact as expected. According to the California Air Resource Board, ARB Almanac 2006-Chapter 2: Current Emissions and Air Quality- Criteria Pollutants, VOCs from architectural coatings in California account for approximately 3.96% of the total statewide VOC gases and 0.40% of total statewide emissions.

2005 Statewide Emission Inventory Summary (Emissions tons/day, annual average)

Category	ROG (VOC)	CO	NOx	Sox	PM10	PM 2.5	NH3
Total Statewide	2430	13,766	3219	302	2213	860	670

Architectural Coatings VOC	95.1 tons/day
Total Statewide emissions	23,460 tons/day
Total%	0.4%

For maximum environmental protection, low VOC coatings combined with energy-efficiency would make a bigger impact on reducing airborne pollution.

http://www.energy.ca.gov/2006publications/CEC-600-2006-013/CEC-600-2006-013-SF.PDF

http://www.arb.ca.gov/app/emsinv/emssumcat_query.php?F_YR=2005&F_DIV04&F_SEASON=A&SP=2006&F_AREA=CA#NATURAL%20%28NON-ANTHROPOGENIC%29

http://www.arb.ca.gov/research/abstracts/95-302.htm

Response: Green Seal agrees with the comments and acknowledges that there are other significant sources of VOC that contribute to smog and ozone depletion other than VOCs from paint. Green Seal intends to include reflective coatings in the scope of the standard due to the importance of this product category in terms of impacts on energy efficiency and global climate change. In addition, Green Seal agrees that VOC levels in the original GS-11 standard can be lowered with the current advancements in formulations, necessitating a revision of the standard. As a point of clarification, Green Seal wants to distinguish between paints or coatings that meet the GS-11 VOC criteria and paints and coatings that are Green Seal-certified. While VOC limit is a crucial consideration with paints and coatings, the VOC levels set by Green Seal must be considered in conjunction with the other life-cycle based criteria including aromatic content, performance requirements, environmental and human health considerations, packaging and end-of-life management requirements. Green Seal has proposed to lower the VOC levels in the original GS-11 standard to be consistent with California Air Resources Board.

Comment: 4.0 Product-Specific Health And Environmental Requirements
[---] suggests that the current VOC content and aromatic compound limits are adequate and should not be modified at this time.

Comment: An alternative to low VOC content is to use VOCs with low reactivity.

Comment: If, over the objection of [---], Green Seal does modify the VOC limits, it should not use the Rule 1113 VOC limits since these limits do not represent a consensus within the regulated community. We oppose the adoption of unrealistic limits on the use of VOCs in coatings, as the regulated community does not concede that they are feasible. In fact, [---] and its affected members have consistently commented on the technical infeasibility of Rule 1113, particularly in its application outside the relatively benign climate of Southern California. [---] and others continue to have serious reservations about the performance of coatings that can meet the requirements of Rule 1113, particularly in colder climates especially for exterior applications. [---] has consistently pointed out that one of the major flaws of extremely low VOC limits is the

lowered performance of these coatings, which requires more frequent repainting, thereby obviating any environmental benefit attained by the initially lower emissions of VOCs.

Furthermore, we believe that it is the ozone formation potential that is crucial when evaluating chemicals for potential environmental harm.

Comment: In addition, in section 4.4 you test VOC by D6886. This method cannot be used to test 2K coatings, and since, as you state, VOC levels <15% cannot be tested by EPA 24 according to your standard, you have oddly excluded the only method to test these materials to meet this standard (since you need less than 15% to meet 100 g/l).

Comment: The reason I support VOC in colorants being calculated is for three reasons:
(1) Colorants without gycols have better hide, stability and less chance of surfactant leaching.
(2) Universal tints for accent colours often require multiple coats to get decent hide. Sometimes contractors paint yellow walls 3-5 times to get hide and that's three to five time more VOC in the polymer and colorants.
(3) Every reduction in VOCs is good for the environment.
Reducing paint VOCs does very little for overall atmosphere protection; however, combining many different features will add up to more atmopsheric protection.

Comment: I do not support counting colorants as part of the VOC calculation because the paint manufacturers, in many cases cannot control the colorant used at the point of purchase. Universal colorants are used by the stores to enable them to tint both water based and solvent based paints. This would require each store to set up a second tint machine to use glycol free colorants. The glycols in the colorants serve a very important role. They keep the pigments from drying out, causing dry specs in your paint or clogging up the tint machine. I have also, investigated the compatibility of no VOC colorants in some paint lines and have found that they are not always compatible, limiting the ability to use them. Your comment that "colorants without glycols have better hide, stability and less chance of leaching is not precise. In store colorants are not as concentrated as used in manufacturing since they need to be used to provide very pale to deep colors. Using a more concentrated colorant may preclude some light colors - smallest increment yields too strong of a color. Regarding stability, I have already mentioned the positive effects of glycols in colorants, do you have specific data that supports your position with regards to the several colorant systems utilized by paint stores? Regarding surfactant leaching, same question.

Regarding your comment on painting yellow walls 3-5 times to cover, while this may be true in your case, this comes down to what price the customer will bear. I can make a yellow that will hide in 1 coat but no contractor would pay the price for it due to the prohibitive cost of the pigment. In order to paint a bright yellow wall, I would suggest that you can do it in 2 coats. First purchase the best quality 1 coat hide paint, then tint a primer yellow as the undercoat, then topcoat with your yellow, thus eliminating the need for 5 coats.

Comment: The South Coast California limit for Primers is 100 VOC. Was it a mistake to list it at 50 VOC in the standard? Please fix the limit to 100 VOC to stay parallel to SCAQMD.

Comment: There are currently no regulatory bodies that include colorant at the point of sale in their calculations. You would be better off accepting the current rule 1113 from SCAQMD.

Comment: The VOC concentration of the product shall not exceed those listed below in grams of VOC per liter of product as determined by ASTM D6886-03 Standard Test Method for Speciation of the Volatile Organic Compounds (VOCs) in Low VOC Content Waterborne Air-Dry Coatings by Gas Chromatography, less those compounds measured by ASTM D6886-03 with boiling points above 250C (as specified in the definitions in section 2.21). A VOC limit with colorant added is not consistent with current EPA, AIM or SCAQMD and CARB regulations.
For primer/undercoats – currently proposed at 50g/l – Green Seal rationale in the scoping

document is that gloss of primers is less than 5 at 60 degrees, therefore consider them flat paints. However, primers and undercoats can have a higher gloss and as such should be at 100g/l.
Floor coatings – to meet the requirements of a floor coatings, a harder polymer is needed. VOC limit should be increased to 150g/l to ensure quality coatings can meet the requirement.

Comment: We have a few reservations to the proposal of including colorants in VOC calculations. As it was already pointed out by a member we also want to put emphasis on the issues, which we consider to be important.
a) The difficulty to abide by VOC content limits at the POS, if we the paint manufacturers have no or only limited control on the amount of colorants added to tint bases. This point needs to be addressed and clarified.
b) The importance of VOC content in universal colorants: It is a well known fact that the glycols provide crucial properties to colorants. They contribute to the shelf-life of products, prevent caking in the can and most important they delay the drying of colorants to hinder clogging of the nozzles at dispensing machines. Contrary to what was stated by one member glycols have no negative impact on the stability and compatibility of colorants with solvent and water based tint bases.
c) The cost of conversion: (1)-The zero or low VOC colorants will demand more sophisticated and new generation surfactants and specific additives to reduce the negative impact of absence of glycols. These changes will translate into 20% rmc increase and will affect our competitiveness. (2)-The introduction of zero or low VOC colorants will necessitate a second set of tinting machines at the stores to accommodate the Green-Seal requirements. Not to forget to mention that these machines have to be equipped with special features to prevent the clogging at dispensing machines.
In view of above points, as a colorant producer besides being a paint manufacturer, we are aware of the difficulties and complexity of reformulating the conventional colorants into zero or low VOC products and we are also familiar with the problems experienced in the market place with zero-VOC colorants. Currently we have an ongoing project to remove glycols and APEO surfactants from our actual formulations by taking difficulties into consideration encountered on the market, as we do not intend to run into similar problems. We do not welcome the proposal completely and find the timing premature. However, if Green-Seal insist to pursue with their suggestion, we expect an acceptable time limit for the transition.

Comment: Although some of the points mentioned are valid, for deep bases we uses non-VOC colorants. We add the colours into the polymer during manufacturing. Colour range is limited, but the basis of these GS-11 updates is based on how best to protect the environment and VOCs are contained in Universal Colorant systems. In other countries such as Australia and New Zealand zero VOC colorants used to be standard practice. Since the overall environmental impact of VOC's in colorants is small with respect to contributing to reducing ground level ozone depletion and urban smog, I really do not have a problem if the current standards stay the same. Even VOCs in latex coatings contributes very little to reducing airborne pollution. The CARB put architectual paint VOCs at only 0.39% of the total statewide ROGs within California. My main push for GS-11 is to include new energy-efficient coating standards and give them high LEED points because this will make a major impact on reducing global warming.

Comment: These limits for each category appear to include colorant. This is inconsistent with the current Environmental Protection Agency (EPA) National Architectural and Industrial Maintenance (AIM) Rule considerations, California Air Resources Board (CARB), and South Coast Air Quality Management District (SCAQMD) constraints where colorant is not included as part of the VOC content calculation. The commercial tint bases will be at or near the VOC limit for the category or paint, and the colorant add will push the total VOC past the category limit. If Green Seal selects an arbitrary lower VOC limit for each category to allow for an “average” colorant add, then there will be no way for the factory colors or the whites formulated to the category limit to meet the Green Seal standard. In addition, the 50 g/L limit for primers may be appropriate for wallboard sealers, but is too low for wood primers and enamel undercoaters.

Finally, ASTM D6886-03 (the standard upon which these limits are based) is not written in a way that it can currently handle a boiling point cutoff for VOC. In contrast, ISO 11890-2 is a very similar GC method that suggests use of diethyl adipate as a 250°C boiling point marker (in conjunction with the Paints Directive 2004/42/EC). As a result, ISO 11890-2 would serve as a more suitable test method for use in GS-11.

We suggest the first sentence under section 4.4 read as follows:
"The VOC concentration of the product shall not exceed those listed below in grams of VOC per liter of product as determined by ISO 11890-2 Paints and varnishes - Determination of volatile organic compound (VOC) content - Part 2: Gas-chromatographic method using diethyl adipate as the marker compound".

Comment: The inclusion of colorants in the VOC calculation needs to be eliminated. It is virtually impossible to control the VOC due to colorants when the material has left the control of the manufacturer. For example, the [---] products are sold in Lowes Home Improvement Center. [---] has no control over the colorants used by Lowes.

Comment: Manufacturer determination of VOC content from formulation data should be allowed, since that is the most accurate and economical means. Eliminate reference to colorants, indicate that: "Calculation of VOC shall exclude water and exempt compounds." Recommended VOC content levels:

Product Type	VOC Level (g/L)
Interior Flat Topcoats	50
Exterior Flat Topcoats	100
Non-Flat Topcoats	100
High Gloss Non-Flat Topcoats	150
Primers, Sealers & Undercoaters	150
Floor and Reflective Coatings	100
Anti-Corrosive Coatings	250

Discussion: Exterior Flat Topcoats require higher VOC content than Interior Flat Topcoats, to develop adequate performance under exterior exposure conditions. High Gloss Non-Flat Topcoats require higher VOC content than semi-gloss or low-sheen non-flats, because of the higher resin content of high gloss non-flats. Primers, Sealers & Undercoaters need higher VOC content than Flat Topcoats because primer performance is critical to allowing the successful use of lower VOC topcoats.

Comment: Primers
Lowering the VOC requirements for all Primers to 50 grams per liter is unrealistic. We feel there is no problem achieving Green Seal's proposed level of 50 g/L for a conventional interior wall primer/sealer. However, the proposed VOC limit is to restrictive for architectural primers designed for other interior and/or exterior construction substrates or primers engineered with performance enhancements such as the ability to seal out stains or to bind chalk.

Universal Machine Colorant
Currently, [---] is not comfortable moving to zero VOC universal tinting colorant. Like many of the Nations Paint Manufacturers, we feel there are real performance and compatibility issues with today's zero VOC universal colorant technology. We continue to perform R&D Laboratory evaluations on the colorant technology that is presented to us. [---] has established a goal of replacing our current universal tinting colorant with zero VOC colorant for all [---] locations within the next few years, provided we can be assured that the colorant technology will facilitate the performance and compatibility that our customers demand and deserve. Secondly, calculating accurate levels of VOC in grams per liter, when colorant is added to a paint coating, can be extremely difficult due to the fact that the VOC level of each colorant is different.

Comment: Australian Ecolabel program.
http://www.aela.org.au/standards/GECA 23-2005 - Architectural Coatings.pdf

The VOC levels in the various product types are too high. The Australia Ecolabel Program has much lower interior and exterior flat and non-flat topcoats and undercoats (see link above). Also, the VOC levels is above the recent MPI Green Performance Standard GPS-2-07, where the standards for Interior flat /non-flat intermediates & topcoats, and exterior flat/non-flat intermediates & topcoats are all at 50g/L.

http://www.paintinfo.com/GPS/MPI GPS 2007.pdf

Response: Green Seal believes that the VOC levels are in need of revision as the VOC levels in the original GS-11 issued in 1993 are no longer appropriate given the current advances in formulation and technology. Green Seal agrees with the comments and has elected not to use VOC limits set by South Coast Air Quality Management District (SCAQMD) due to the fact SCAQMD addresses VOC limits and Green Seal's life-cycle based approach includes criteria for performance requirements, prohibited chemicals, aromatic content limit, VOC limits, packaging requirements and end-of-life management. In addition, Green Seal agrees with the comments that a national standard should take into considerations high variability in climate and other environmental conditions. SCAQMD has admitted that the some of the limits Rule 1113 are not intended necessarily for areas outside their region and contains an exemption for high-elevation areas. In addition, SCAQMD includes an averaging provision whereas a manufacturer is allowed to sell a product that does not meet the VOC level, if it demonstrates over-compliance with another product. Therefore, Green Seal does not wish to use the VOC levels set by SCAQMD at this time.

Green Seal proposed a VOC limit of 50 g/L for primers and undercoats since primers and undercoats have been certified under the previous GS-11 according to gloss and since most primers and undercoats are flat, certified primers and undercoats have met the 50 g/L limit. However, given the additional performance and human health and environmental criteria, Green Seal agrees to be more inclusive of the many uses of primers and undercoats and has raised the VOC limit for the primer or undercoat from 50 g/L to 100 g/L, which maintains consistency with CARB. Green Seal also believes that floor coatings should remain at 100 g/L as proposed, consistent with CARB, and should not be raised to 150 g/L. Green Seal recognizes that while there may be performance requirements and variations with VOC levels, there are not significant reasons to continue distinguishing between interior and exterior coatings, but that defining VOC levels in terms of flat or non-flat topcoats is appropriate. This approach is in accordance with EPA AIM, CARB, SCAQMD and the Ozone Transport Commission (OTC).

Green Seal recognizes that the proposed revised VOC limits are higher than those cited in the Australian Eco-Label program, but Green Seal does not believe that setting interior flat/non-flat topcoats at 14 or 16 g/L and exterior flat topcoats at 50 g/L and exterior non-flat topcoats at 70 g/L is appropriate or applicable to the U.S. industry at this time. Master Painters Institute (MPI) lists a two-tiered system and the GPS-1 level states interior flat topcoats at 50 g/L and interior non-flat topcoats at 150 g/L and exterior flat topcoats at 100 g/L and exterior non-flat topcoats at 150 g/L. The second tier, GPS-2 level sets VOC levels consistent with SCAQMD (all categories at 50 g/L), which Green Seal does not believe are appropriate for the reasons stated above. The VOC limits in the proposed GS-11 revised standard either meet or are more stringent than MPI GPS-1.

Green Seal acknowledges the comments, but does not wish to establish reactivity-based limits as Green Seal believes that VOCs should be considered in terms of smog and ozone production potential as well as indoor air quality. Paints and coatings are often applied in interior settings exposing users and related personnel to components that volatize in the air, which is one of the main reasons for defining VOCs in terms of boiling point and citing VOC methodology that utilizes gas chromatography in favor of mass-based calculations like U.S. Method 24. Furthermore, Green Seal agrees with the Staff Report for the Proposed Revised Amendments to the Suggested Control Measure for Architectural Coatings issued from CARB in September 2007 that states that using maximal incremental reactivity (MIR) is premature and

is need of additional research before implementation. Green Seal may revisit the reactivity-based limits in a future revision provided issues of indoor air quality are properly addressed at that time.

Green Seal acknowledges the comments and has modified the methodology, citing a boiling point marker when using ASTM D6886 and has listed ISO method 11890-2 (Gas Chromatographic method). In addition, if ASTM D6886 cannot be used to determine VOCs for a certain type of paint or coating, there is a provision for alternate, comparable scientifically validated methods for emerging methodology like the static headspace method, but must be accompanied with documentation to Green Seal.

Green Seal acknowledges the comments to the inclusion of colorants in the VOC determination. Based on the current available technologies and industry practice at this time, Green Seal has determined to remove the colorant reference in this section. However, Green Seal wishes to address the potentially significant increase in VOCs with colorants added at the point-of-sale, which Green Seal believes is widely unknown. Therefore, Green Seal is proposing an additional criterion for VOC limits that will include colorants added at the point-of-sale. Based on research from colorant manufacturers, Green Seal has determined that for a deep or accent base up to 12-14 oz of colorant can be added per gallon of base paint and the VOC levels of convention colorants vary but are estimated to be on average 300-600 g/L. As stated in the definition section, Colorant is defined as the maximum amount recommended for use by the manufacturer. Using simple proportional calculations, the typical maximum amount of 12 oz colorant for a gallon of paint (128 oz) for the lower estimated VOC (300 g/L) would result in:

12 oz/128 oz * 300 g/L = 28 g/L VOC added by colorants added at the point-of-sale.

The same calculation given the higher estimated VOC (600 g/L):

12 oz/128 oz *600 g/L = 56 g/L VOC added by colorants added at the point-of-sale.

The VOC limits for the Colorants Added at the Point-of-Sale are from the lower estimated VOC level (30 g/L) + base paint VOC Limits. The Green Seal average VOC level that will be applied is 50 g/L, derived from the estimated higher estimated VOC level. Green Seal will use the estimated average of 50 g/L unless a manufacturer can provide documentation of the colorant(s) VOC level and specifies that only the colorant tested shall be used with the product. As an example, a rough assessment of current Green Seal-certified products, most of which are interior flat or non-flat, shows that >90% of certified paints have VOC levels <11 g/L. Therefore, assuming a typical Green Seal-certified flat topcoat, using the Green Seal estimated average of 50 g/L:

11 g/L (base paint) + 50 g/L= 61 g/L VOC including colorant added at the point-of-sale, which meets the criteria.

However, there are a few Green Seal-certified products that are >11 g/L. Assuming a typical Green Seal-certified flat topcoat given the GS-11 limit of 50 g/L and using the Green Seal estimated average of 50 g/L:

50 g/L + 50 g/L = 100 g/L VOC including colorant added at the point-of-sale, which does not meet the criteria.

In this instance, the product would either have to be reformulated to reduce the VOCs of the base paint, or the manufacturer can demonstrate that for the maximum level of colorants recommended for use with the product, the VOC of the colorants does not exceed the limit for Colorants Added at the Point-of-Sale VOC Limit of 80 g/L. If acceptable documentation is received, the manufacturer must specify that only the colorants tested shall be used with the product. The requirements for VOC Limits and Colorants Added at the Point-of-Sale VOC Limits read as follows:

Volatile Organic Compound (VOC) Content Limit. The VOC concentration of the product shall not exceed those listed below in grams of VOC per liter of product as determined by International Organization for Standardization (ISO) 11890-2 Paints and varnishes -- Determination of volatile organic compound (VOC) content Part 2: GC/MS method or ASTM D6886-03 Standard Test Method for Speciation of the Volatile Organic Compounds (VOCs) in Low VOC Content Waterborne Air-Dry Coatings by Gas Chromatography using 250°C as a specified limit.[3] *Alternatively, another comparable scientifically validated test method may be used, but must be documented in sufficient detail for Green Seal review.*

The calculation of VOC shall exclude water and colorants added at the point-of-sale.

Product Type	*VOC level (in g/L)*
Flat Topcoat	*50*
Non-Flat Topcoat	*100*
Primer or Undercoat	*100*
Floor Coating	*100*
Reflective Coating	*100*
Anti Corrosive Coating	*250*

Colorant Added at the Point-of-Sale VOC Content Limit. The VOC concentration of the product including colorant added at the point-of-sale shall not exceed those listed below in grams of VOC per liter of product as determined by the methods listed in Section 4.4. Green Seal will apply an average VOC level calculation unless a manufacturer can provide documentation of the colorant(s) VOC levels and specifies that only those colorant(s) will be used with the product.

Product Type	*VOC level in g/L*
Flat Topcoats with colorant added at the point-of-sale	*80*
Non-Flat Topcoats with colorant added at the point-of-sale	*130*
Primer or Undercoat with colorant added at the point-of-sale	*130*
Floor or Reflective Coating with colorant added at the point-of-sale	*130*
Anti-Corrosive Coating with colorant added at the point-of-sale	*280*

4***.5 Volatile Organic Compound Emission Limit. Any product, including colorant, intended for interior use shall not emit volatile organic compounds in concentrations that exceed those listed below at 168 hours in environmental chambers as measured using ASTM D 5116-06 Standard Guide for Small Scale Environmental Chamber Determinations of Organic Emissions for Indoor Materials/Products; ASTM D 5197-03 Test Method for Determination of Formaldehyde and other Carbonyl Compounds in Air (Active Sampler Methodology) and ASTM D 6169-03 Practice for the Selection of Sorbents and Pumped Sampling/Thermal Desorption Analysis Procedures for Volatile Organic Compounds in Air.***

Individual VOCs <0.1 TLV*
Formaldehyde 0.05 ppm
4-phenylcyclohexene 0.0065 mg/m3
Styrene 0.07 mg/m3
Total VOCs 0.5 mg/m3

[3] For VOC levels >15%, US EPA Method 24 or ISO 11890 *Paints and varnishes -- Determination of volatile organic compound (VOC) content Part 1: Difference method* may be used.

Total aldehydes 0.1 ppm

Any pollutant regulated as a primary or secondary outdoor air pollutant must meet a concentration that will not generate an air concentration greater than that promulgated by the National Ambient Air Quality Standard (U.S. EPA, code of Federal Regulations, Title 40, Part 50).

**** Any pollutant not listed must produce an air concentration level no greater than 1/10 the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, Cincinnati, Ohio 45211-4438).***

Comment: I would like to see 1. the measurement methodology to include the California Department of Health Services Standard Practice for The Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers.

http://www.dhs.ca.gov/ps/deodc/ehlb/iaq/VOCS/Practice.htm

This methodology is presently used in the Collaboration for High Performance Schools which is adopted by many school districts in California and other states. LEED for Schools for New Construction and Major Renovations Version 2007 also includes this method as part of its Indoor Environmental Quality Credits.

http://www.usgbc.org/ShowFile.aspx?DocumentID=2593

As there are concerns for indoor air exposure to chemicals off-gassing from paints, is there considerations for a separate indoor and outdoor VOC levels?

Comment: This appears to be the test criteria for GreenGuard certification. Does Green Seal intend to provide multiple sources for this testing, as it is very costly?

Comment: Where justified by a defensible estimate of real risk inclusion of specific emission limits for specific compounds is appropriate. However, inclusion of a specific emission limit for a class of compounds such as aldehydes where the potential health affects range from significant to nil is inappropriate. This class listing should be replaced with specific aldehydes of concern.

Comment: This section provides recommendations for limits on specific chemical species but it also includes a 0.1 ppm limit on total aldehydes. The formaldehyde limit placed at 0.05 ppm is very specific and clear, presumably because of the known toxicity of formaldehyde. However, "total" aldehydes would logically include other chemical species for which the link to toxicity and permissible exposure is not defined. Many naturally occurring products such as sugars are aldehydes. There is simply no need to rule out all aldehydes. This broad brush approach to a class of chemicals with no link to definable toxicity profiles places a restriction on a coating supplier with no scientific justification. Furthermore, the lack of specificity can lead to the prevention of introducing novel technologies – particularly technologies based upon the growing availability of bio-based feedstocks. The use of bio-based feedstocks should be a prime interest for such standards but over-reaching restrictions can create roadblocks to developing such technology.

It is our opinion that the restrictions of section 4.5. should be edited to include specific chemical species that have definable toxicity or negative environmental impact profiles. Inclusion of vague classifications of chemicals is not appropriate and should be removed from this document.

Comment: This will require expensive testing of each product in combination with each colorant and is not practical considering the very limited number of qualified testing facilities in the U.S.

Comment: Eliminate reference to colorant in this section. We would recommend that the emission testing specified in this section be allowed in lieu of – not in addition to -- compliance with the VOC levels in the previous section.

Comment: What is the basis of using the <0.1 TLV for individual VOCs? A number of TLVs are not health-based, are based on studies that are questionable, or need to be reevaluated as they used studies that are decades old. Also, the 10-fold safety factor is unlikely to be protective of children, and other sensitive population. I suggestion using health-based numbers that are more recent such as OEHHA Chronic Reference Exposure Levels as in Section 01350. http://www.ciwmb.ca.gov/GreenBuilding/Specs/Section01350/

Response: Green Seal acknowledges the comments and agrees that indoor air testing, which is included in LEED for Schools New Construction and Renovation Version 2007 and the Collaboration for High Performance Schools can provide valuable information about off-gassing from materials. However, Green Seal must take into account all criteria in the standard to ensure that the complete standard is not cost-prohibitive. Green Seal is cognizant about the limited amount of laboratories that are currently available to conduct small-chamber testing and the relatively high costs of the test, as small-chamber testing is not a routine test and no manufacturers have the capabilities to run the test in-house. Green Seal also agrees with the comments that there is some discussion about which compounds should be included in the list to test during small-chamber testing. While the precision and comprehensive list of compounds is increasing, small-scale chamber testing in some instances is limited due to a set number compounds which may or may not be the compounds of interest. A report by U.S. EPA in Fall/Winter 1998 concluded that low-VOC paints does not necessarily mean no-emissions as small-chamber testing demonstrated an off-gassing of formaldehyde. The report stated that the formaldehyde was likely from the biocide, the paint formulation, side reaction or other additives. Formaldehyde contained in the biocide, the paint formulation or other additives would be addressed the materials audit as formaldehyde is prohibited in the proposed list of Compound Prohibitions. In addition, formaldehyde-releasors, a likely source of side reactions that may release formaldehye over time are also prohibited by the Specific Compound Prohibitions. Therefore, Green Seal accounts for several sources of formaldehyde in the materials audit in the formulation of the paint. In addition, Green Seal also includes other compounds in the Compound Prohibitions including hazardous air pollutants and ozone-depleting chemicals, which would likely contribute to indoor air quality issues. The descriptor of "volatile" has been added to the aromatic limit and the limit has been lowered in order to reduce the amount of volatile aromatic compounds in the product. The EPA report also criticizes EPA Method 24 as a determination of VOC levels. The methodology listed in the GS-11 proposed revision are gas chromatography methods based on boiling point, which are much more precise determinants of VOCs, particularly when defined according to boiling point and are more inclusive of compounds that would readily volatilize and contribute to VOCs and indoor air quality. Given the compound prohibitions and VOC metholodogy in the GS-11 proposed revision and given the limited availability of laboratories, high cost and increasing development of specific compounds, Green Seal believes that the previously listed criteria including Compound Prohibitions, Specific Compound Prohibitions and VOC limits adequately address issues of indoor air quality and small-scale chamber testing is not warranted at this time and has been removed the requirement from the standard. Green Seal will revisit the inclusion of small-scale chamber testing during the next revision as improvements in the methods may be above what can be addressed through formulation materials audit and VOC Limits and a greater availability of laboratories may allow for inclusion in the standard.

5.0 Packaging Requirements

5.1. Recyclable Package. The product's package shall be recyclable.

Comment: 5. Packaging Requirements
[---] believes that the current packaging requirements are adequate. [---] is concerned about any potential changes to the packaging requirements based on "environmental impacts of the end-of-life management of paint" since any such decisions can only be made based on a technically sound life cycle assessment.

Comment: Once again this is an area of concern for [---]. Over the past few years we have evaluated a number of recycled container programs that have been presented to us and are still not comfortable with the integrity of the packaging and long term service life. Our experience has shown us that there are many factors that affect the performance of recycled plastic such as; extreme temperature changes, when the packaging is subject to equipment designed to mix or agitate the liquid in the container and excessive opening of the container's lid and/or plug.

Response: Green Seal believes that there have been improvements and new developments of packaging that go beyond the requirements in the original GS-11 standard, demonstrating a clear need to update the packaging requirements to stay current with the growth of the industry. Green Seal believes that promoting recyclable packaging is important, but is cognizant of the potential ramifications of improper disposal of product; therefore, "Proper disposal of leftover product" is addressed both the End-of-Life Management Section as well as the Labeling Section. Based on its research, Green Seal has determined that paint packaging is either steel, polypropylene (PP, plastic resin #5) and in some instances high-density polyethylene (HDPE, plastic resin #2). Steel can be accepted both curbside and drop-off collection sites in many communities. Plastic containers present a problem in recycling facilities as many HDPE containers contain a metal ring, which in addition to paint residue, prevent plastic from being recycled in the majority of communities. Some packaging suppliers are offering PP, which is not accepted in communities, but if it can be returned to the correct facility, it can be recycled. Green Seal wants to encourage the use of materials that can be recycled, but also recognizes the need for an allowance for an effective recycling stream to be established for certain types of materials. In those instances, Green Seal wishes to encourage an effective take-back program for recycling materials or source reduction, where recycling facilities still has technological and logistical hurdles. Comments received in the Scoping Document suggested 10% post-consumer content for plastic containers, which Green Seal has accepted for recovered material content. Green Seal has added a definition of Primary Packaging and has added "Primary" to the Packaging Header. For clarity, Green Seal has also reordered the criteria so that Recovered Material Content follows Recyclable Packaging. The definition for Primary Packaging and the amended Packaging Header and Recyclable and Recovered Material Content requirements are as follows:

Primary Package. Package that is the material physically containing and coming into contact with the product, not including the cap or lid.

PRIMARY PACKAGING REQUIREMENTS

Recyclable Packaging. The packaging shall be recyclable. An exception shall be made for packaging that can be recycled as part of a manufacturer take-back program or packaging that contains a minimum of 10% recovered material content.

Recovered Material Content. The packaging shall contain a state-of-the-art amount of recovered and post-consumer content. Where a product's packaging is below these levels, the manufacturer must demonstrate that efforts have been made to use the maximum available post-consumer material in packaging.

5.2. Heavy Metal Restrictions. Heavy metals, including lead, mercury, cadmium, and hexavalent chromium, shall not be intentionally introduced. Further, the sum of the concentration levels of these metals present shall not exceed 100 parts per million by weight (0.01%); an exception is allowed for packages that would not exceed this maximum level but for the addition of recovered materials. Further, intentional introduction does not include the use of one of the metals as a processing aid or intermediate to impart certain chemical or physical changes during manufacturing, where the incidental retention of

a residual of that metal in the final package or packaging component is not desired or deliberate, if the final package or packaging component complies with the incidental concentration restrictions of 100 ppm.

Comment: "Heavy metals" does not appear to be adequately defined in the standard. To be sure, the four examples given (lead, mercury, cad, and hex chrome) would appear on anybody's list of metals to be avoided, but some metals are more benign than others, and their use should be encouraged. It would be useful if the standard could provide some guidance by providing a more comprehensive list of undesirable metals and preferable substitutes.

See also my comment following section 4.1.

Comment: I agree with [---]'s comments

Response: Green Seal believes that the heavy metal definition as given in the above requirement is adequate in the understanding that heavy metals, including lead, mercury, cadmium and hexavalent chromium should not be intentionally introduced into the product packaging. The heavy metal restriction in packaging is consistent with the Council of Northeast Governments' recommended regulatory language and Green Seal believes that the specification is necessary to address alternative materials as well as improvements and growth in recycled content material technology. Green Seal wants to allow for technological advances and innovation and does not desire to include a list preferable substitutes in the standard.

5.3. Other Restrictions. Phthalates are prohibited from being intentionally introduced; an exception is allowed for packages that would not have added phthalates but for the addition of recovered material.

Comment: This would eliminate plastic pails for paint. The initial intent of phthalate restrictions was in food, beverage, and cosmetic industries, where the consumer comes into direct contact by ingestion, etc.

Response: Many ortho-phthalates are known endocrine disruptors. This requirement prohibits phthalates from being "intentionally introduced" and addresses issues or plastic additives used to soften polyvinyl chloride (or PVC, plastic resin #3), which although currently not common packaging materials in the industry, Green Seal believes that it is important to be comprehensive in standard-development and disallow any known alternatives that have known human health and environmental impacts.

5.4. Recovered Material Content. The packaging shall contain state-of-the-art amount of recovered and post-consumer content. Where a product's packaging is below these levels, the manufacturer must demonstrate that efforts have been made to use the maximum available post-consumer material in packaging.

Comment: Define State of the Art... what % post consumer material?

Response: State of the art is defined as what is technologically feasible at the time and is intended to allow for innovation. As there are different types of materials that may be used as packaging, it is specified to allow for technological innovations throughout the standards. Manufacturers can demonstrate leadership levels by continuing to increase recovered material content as technology increases.

6.0 End-of-Life Management

6.1. Consumer Education. The manufacturer shall provide information to the consumer through print, online or other accessible media regarding:
• Purchasing the amount of product needed for a specified job.

• Discouraging improper disposal of the product and packaging.
• Consulting with local authorities for proper disposal or recycling opportunities for leftover product and packaging.
• If a manufacturer provides a take-back program, how the product and/or container can be returned.

Comment: The first bullet item "Purchasing the amount of product needed for a specified job," seems to be in need of some specific guidance. I'm sure I'm preaching to the quire, but regarding architectural coatings, there are at least two methods to determine the amount of coating needed: *theoretical* and, for lack of a better term, *practical*. *Theoretical* coverage, calculated based on contrast ratios, hiding power, and spreading rates, assumes no material will be lost during application. *Practical*, on the other hand, attempts to factor in material loss based on, among other factors: application method, applicator's expertise, and substrate condition. Without specific purchasing recommendation guidelines, one paint store may recommend calculations based on one method, another company the other method, and yet another company some method in between. This could result in wide purchasing recommendation variances that may or may not resolve the issue of consumers purchasing more paint than needed for a specific job. I do not have a specific proposal or recommendation for this section, other than that the committee should discuss if they feel elaboration on this bullet is warranted, and if so, what the specific guidelines should be.

Comment: Consumer education sounds like a good idea, but does Green Seal actually believe that manufacturers really care about this? I doubt it. To them it's all bottom line politics.
The majority of coating manufacturers within the USA, will only subscribe to green coating technology if (a) they can make money from it (b) if they think they'll lose market share to a competitor (c) it's easy to do and they think they can score some PR points (d) government legislates change. And this is what must happen in the USA: The EPA must enforce stricter environmental guidelines on the US coating industry under the *Clean Air Act.* Education is good, but real action is better.

Comment: [---] did actually work on some consumer education points on end-of-life management that they actively promote. Product stewardship is the role of manufacturers, standards-setting bodies (like Green Seal), and the end-user. Whether manufacturers are resistant to the idea of consumer education at first or not (and they may well not be), does not negate the responsibility of environmental standards setters to educate consumers. Informational labels, product usage instructions, online or other educational media is a pertinent clause in GS-11.

Comment: I think that many consumers get caught up in the hyperbole and gross exaggeration of the marketing claims made by some coating manufacturers. All too often you hear that if you purchase low VOC coatings, you're saving the atmosphere and you'll go to heaven. In reality low VOC coatings do very little to protect against ground level ozone depletion and urban smog according to actual statistics from the CARB. This is how some manufactures are educating the public. Secondly, some manufacturers of low VOC coatings claim their products are rigorous tested and are guaranteed to last a long time, thus improving life cycling benefits. They don't state the estimated life expectancy they just say a "long time." The reality is that flat sheen coating contain many fillers which are water sensitive and lower the long term durability of the coating. Regardless of the many ASTM tests which coatings go through, if the specified DFT is only 1.4-1.8 mils in two coats for an exterior wall application, solar energy will be absorbed through the coating leading to expansion and contraction. All you need to do is put a thermal image camera over a painted wall to see this. The problem here is that consumers will pay more and there will also be responsible for more environmental damage, which they don't want. If you have to recoat a wall every few years, you're wasting energy on fuel for vehicles and power to operate spray rigs, powerwashers etc. You're spraying more VOCs into the atmosphere. And, you're wasting energy manufacturing the coating. The amount of energy required to separate monomers from petroleum is very high as it is burning pigments in large vats. If consumers were educated about the maximum negative environmental effect of many of today's "green" coatings I'm sure they'd be very concerned. Manufacturers won't tell them this information. If

more manufacturers were socially responsible and made quality products without the exaggerated claims then consumers would receive tangible environmental benefits. Education is a great idea, but can we trust manufacturers to be truthful?

Response: Green Seal has clarified the wording of the "Purchasing the amount of products needed for a specified job," but recognizes that there are multiple ways to calculate how much paint in needed, but does not intend to dictate specifically how the calculation should occur. Consumer Education requires that manufacturer provide information to educate the consumer to buy only what is needed for a certain job as source reduction is one of the most effective ways to reduce leftover paint. Green Seal has also included additional important education points including "Instructions for proper application of the product". Green Seal agrees and believes that consumer education and end-of-life management are pertinent inclusions in life-cycle considerations in the paint standard as Green Seal's mission of promoting sustainability in the marketplace incorporates consumer education and communication source reduction and proper disposal. Green Seal acknowledges the comments and recognizes that product durability is important in the overall sustainability of a product and VOC levels are address in the draft standard in regards to their contribution to smog and ozone production potential and indoor air quality. Green Seal has included in the GS-11 updated draft standard VOC Limits and Colorants Added at the Point-of-Sale VOC Limits, Volatile Aromatic Limits, Compound Prohibitions and Specific Compound Prohibitions to address issues of indoor air quality. Green Seal recognizes the value of third-party verification for manufacturer claims and emphasizes there are socially responsible manufacturers in the industry who are proactive and making strides in environmentally preferable practices. Green Seal development of the Addendum is designed to recognize those manufacturers who have demonstrated leadership beyond the GS-11 draft standard. For consistency among Green Seal standards, Green Seal has moved the End-of-Life Management section prior to the Packaging section. The requirement now reads as follows:

Consumer Education. The manufacturer shall provide information to the consumer through print, online or other accessible media regarding:

- *Proper purchasing of product amount needed for a specified job.*
- *Instructions on proper application of the product.*
- *Discouraging improper disposal of the product.*
- *Consulting with local authorities for proper disposal or recycling opportunities for leftover product and packaging.*
- *If a manufacturer provides a take-back program, instructions on how the product and packaging can be returned.*

6.2. The manufacturer shall demonstrate that paint not salable from the manufacturing process is utilized locally and/or domestically where there are existing markets.

Comment: Delete this section, since local or domestic options may not be environmentally preferable to international export options, particularly those involving Canada or Mexico.

Response: Green Seal recognizes the importance of international export options, but wishes to encourage local options where possible to promote less transport and carbon emissions as well as ensure proper government regulations are upheld. This requirement is intended to encourage material diversion from the waste stream in combination with the Recycled-Content Latex Paint standard (GS-43). However, for clarification, Green Seal has changed the wording from "paint not salable" to "Leftover paint". The requirement now reads as follows:

Leftover paint from the manufacturing process shall be utilized locally and/or domestically where there are existing markets.