

This is a guidance document with sample specification language intended to be inserted into project specifications on this subject as appropriate to the agency's environmental goals. Certain provisions, where indicated, are required for U.S. federal agency projects. Sample specification language is numbered to clearly distinguish it from advisory or discussion material. Each sample is preceded by identification of the typical location in a specification section where it would appear using the SectionFormat™ of the Construction Specifications Institute; the six digit section number cited is per CSI Masterformat™ 2004 and the five digit section number cited parenthetically is per CSI Masterformat™ 1995.

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**SECTION 09 90 00 (SECTION 09900) – PAINTING & COATING**

**SPECIFIER NOTE:**

*resource management:* Most standard paints contain some materials that are derived from petroleum products. Petroleum is a non-renewable resource and extraction and refining are known to produce air and water pollutants. Paints manufactured from natural plant and mineral based finishes are available. They contain extracts from plant sources and minimally processed earth minerals, such as chalk or iron oxides. Solvents for natural paints include citrus oils and small amounts of low odor petroleum solvents (de-aromatized isoparaffinics.) Milk based paint contains lime, milk protein, clay, and earth pigments. Recycled content paints are available.

*toxicity/IEQ:* Most conventional paint and coating products off-gas VOCs that are added to enhance product performance and shelf life. High quality, low-toxicity, and low-VOC substitutions are now available for these products.

Emissions from paints and coatings are primarily from evaporating solvents and other volatile organic compounds (VOCs) released by oxidation. Water-based paints acrylic latex paints are lower in VOCs (<250 mg/L) than solvent-based paints. Low-VOC is generally accepted to mean paint with a VOC content less than 100 mg/L. While a variety of low-VOC and zero-VOC paints are now available to choose from, they vary in cost, toxicity, and performance. Therefore, paint selection should consider VOC content as well as overall composition and required performance characteristics, including hideability and durability.

A paint can be "low-VOC" yet still contain odorous, toxic, or otherwise undesirable ingredients such as ammonia, formaldehyde, crystalline silica, odor masking agents, and many other compounds, including fungicides and bactericides. In addition, hazardous ingredients can degrade the natural environment during production and after disposal. Look for water-based paints that are formaldehyde-free, Zero- or low-VOC, and low-toxic. "Zero-VOC" or low-VOC paints minimize the indoor air pollution load and health risks to both workers and occupants. Water-based paints are generally safer to handle and can be cleaned up with water, reducing health risks to workers and minimizing/avoiding hazardous waste.

Note, there is no regulatory definition for "zero," "low," "formaldehyde-free," or "low-toxic" VOC paint and coatings. VOC and other constituent contents for these low and zero or constituent free products will vary depending upon the product category.

For additional information, refer to EPA IAQ Design Tools for Schools, "Controlling Pollutants and Sources" [www.epa.gov/iaq/schooldesign/index.html](http://www.epa.gov/iaq/schooldesign/index.html)

*performance:* Milk based paint, the most common paint prior to this century, is not recommended for exterior use or damp conditions.

The performance of low VOC paint has improved considerably over the last several years.

Ceramic coatings for field application over typical exterior cladding materials (masonry, stucco, wood) are also available. Ceramic coatings are low emissivity paints that reflect radiant energy. Such coatings can generate energy savings of up to 30 percent during the cooling season, and are extremely durable.

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section includes:
1. Interior paint, except clear finishes and stains.
  2. Exterior paint, except clear finishes and stains.
  3. Specialty coatings.
    - a. Radiation Control Coatings.
    - b. Anti-Corrosive Paint

## 1.2 SUBMITTALS

- A. Product data. Unless otherwise indicated, submit the following for each type of product provided under work of this Section:

**SPECIFIER NOTE:**

Recycled paint diverts from the waste stream and conserves water, energy, and raw materials. Green building rating systems often include credit for materials of recycled content. USGBC-LEED™ v3, for example, includes credit for materials with recycled content, calculated on the basis of pre-consumer and post-consumer percentage content, and it includes credit for use of salvaged/recovered materials. Green Globes US also provides points for reused building materials and components and for building materials with recycled content.

1. Recycled Content:
  - a. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
  - b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.
  - c. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
  - d. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.

**SPECIFIER NOTE:**

Specifying local materials may help minimize transportation impacts; however it may not have a significant impact on reducing the overall embodied energy of a building material because of efficiencies of scale in some modes of transportation.

Green building rating systems frequently include credit for local materials. Transportation impacts include: fossil fuel consumption, air pollution, and labor.

USGBC-LEED™ v3 includes credits for materials extracted/harvested and manufactured within a 500 mile radius from the project site. Green Globes US also provides points for materials that are locally manufactured.

2. Local/Regional Materials:
  - a. Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
  - b. Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
  - c. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
  - d. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

**SPECIFIER NOTE:**

Green building rating systems may include credit for low emitting materials. USGBC-LEED™ v3, for example, includes credits for low-emitting materials, including: adhesives and sealants, paints and coatings, carpets, and composite wood and agrifiber products. Under LEED™ v3, adhesives and

sealants are to comply with California's South Coast Air Quality Management District (SCAQMD) #1168; aerosol adhesives are to comply with Green Seal GS-36; interior architectural paints are to comply with Green Seal GS-11; anti-corrosive paints are to comply with Green Seal GS-03 (note – Green Seal has withdrawn GS-03; as of November 2008, anti-corrosive paints are included in a revised GS-11); clear wood finishes are to comply with SCAQMD #1113; carpet with the Carpet and Rug Institute (CRI) Green Label Plus; carpet cushion with CRI Green Label program; hard surface flooring with FloorScore; tile setting adhesives and grout with SCAQMD #1168; and, composite wood and agrifiber products are to contain no added urea-formaldehyde.

As per USGBC published Credit Interpretations, the credits for low-emitting materials are directed towards interior, site-installed (i.e. not prefabricated) products. Verify project requirements for low VOC roofing products.

Green Seal, an independent, non-profit organization, certifies low-emitting products using internationally recognized methods and procedures. Green Seal certification meets the criteria of ISO 14020 and 14024, the environmental standards for ecolabeling set by the International Organization for Standardization (ISO); the U.S. Environmental Protection Agency's criteria for third-party certifiers of environmentally preferable products; and the criteria for bona fide ecolabeling bodies of the Global Ecolabeling Network.

3. VOC data: Submit Green Seal Certification to GS-11 and description of the basis for certification.

**SPECIFIER NOTE:**

The Food, Conservation, and Energy Act of 2008 (also known as the 2008 U.S. Farm Bill) largely continues programs of the Farm Security and Rural Investment Act of 2002 ([2002 Farm Bill](http://www.usda.gov/farbill/)) <http://www.usda.gov/farbill/> Section 9002 requires each Federal Agency to develop a procurement program which will assure that items composed of biobased products will be purchased to the maximum extent practicable and which is consistent with applicable provisions of Federal procurement law. USDA designates biobased products for preferred Federal procurement and recommends biobased content levels for each designated product.

USGBC-LEED™ v3 includes credits for use of rapidly renewable materials, which USGBC describes as plants harvested within a ten-year cycle.

Green Globes – US, provides credit for integration of materials from renewable sources that have been selected based on life-cycle assessment.

4. Biobased materials:
  - a. Indicate type of biobased material in product.
  - b. Indicate the percentage of biobased content per unit of product.
  - c. Indicate relative dollar value of biobased content product to total dollar value of product included in project.

- B. Submit environmental data in accordance with Table 1 of ASTM E2129 for products provided under work of this Section.

### 1.3 QUALITY ASSURANCE

**SPECIFIER NOTE:**

The EPA national VOC rule for architectural and industrial maintenance (AIM) coatings and Green Seal GS-11 reference EPA method 24. The AIM rule also explicitly allows for the use of formulation data with the caveat that formulation must be able to stand up to a check by EPA method 24.

ASTM D3960-04 references ASTM D6886 Test Method for Speciation of the Volatile Organic Compounds (VOCs) in Low VOC Content Waterborne Air-Dry Coatings by Gas Chromatography. This new ASTM method gives a direct measurement of VOC in these coatings. Both EPA method 24 and ASTM D3960 indirectly measure VOC in waterborne coatings by first measuring total volatiles (using ASTM D2369) and then measuring (using ASTM D3792 or D4017) and subtracting water to get VOC (VOC = total volatiles minus water). The indirect approach may result in less precision for low VOC waterborne coatings.

- A. VOC Content: Determine VOC (Volatile Organic Compound) content of solvent borne and waterborne paints and related coatings in accordance with EPA Method 24 or ASTM D3960. Provide low VOC products. Comply with:

1. Interior architectural paints: Comply with Green Seal GS-11
2. Anti-corrosive paints: Comply with Green Seal GS-11
3. Clear wood finishes: Comply with SCAQMD #1113

## PART 2 - PRODUCTS

### SPECIFIER NOTE:

EO 13423 includes requirements for Federal Agencies to use “sustainable environmental practices, including acquisition of biobased, environmentally preferable, energy-efficient, water-efficient, and recycled-content products”

Specifically, under the Sustainable Building requirements per Guiding Principle #5 Reduce Environmental Impact of Materials, EO13423 directs Federal agencies to “use products meeting or exceeding EPA’s recycled content recommendations” for EPA-designated products and for other products to “use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10% (based on cost) of the total value of the materials in the project.”

And, under the Sustainable Building requirements per Guiding Principle #4 Enhance Indoor Environmental Quality, EO13423 directs Federal agencies to use “materials and products with low pollutant emissions, including adhesives, sealants, paints, carpet systems, and furnishings.”

Executive Order 13514; *Federal Leadership in Environmental, Energy, and Economic Performance*; was signed on October 5, 2009. <http://www.ofee.gov/execorders.asp> It expands upon the environmental performance requirements of EO 13423.

[http://www1.eere.energy.gov/femp/regulations/printable\\_versions/eo13423.html](http://www1.eere.energy.gov/femp/regulations/printable_versions/eo13423.html)

EO 13514 sets numerous federal requirements in several areas, including sustainable buildings and communities. Federal agencies must implement high performance sustainable federal building design, construction, operation and management, maintenance, and deconstruction, including:

- Ensuring all new Federal buildings, entering the design phase in 2020 or later, are designed to achieve zero net energy by 2030.
- Ensuring all new construction, major renovations, or repair or alteration of Federal buildings comply with the Guiding Principles of Federal Leadership in High Performance and Sustainable Buildings <http://www1.eere.energy.gov/femp/pdfs/mouhighperfsustainfedfacs.pdf>
- Ensuring at least 15% of existing agency buildings and leases (above 5,000 gross square feet) meet the Guiding Principles by fiscal year 2015 and that the agency makes annual progress towards 100% compliance across its building inventory.

## 2.1 MATERIALS

### A. Paints and primers:

#### SPECIFIER NOTE:

US-EPA Comprehensive Procurement Guidelines (CPG) recommends 20 percent post-consumer content for white and light colors of latex paint. US-EPA Comprehensive Procurement Guidelines (CPG) recommend 50-99 percent post-consumer content for dark colors of latex paint.

The definition of "post-consumer materials" in the EPA Comprehensive Procurement Guidelines (CPG) is not the same as the definition of "post-consumer coating" in the AIM rule.

CPG defines post-consumer materials as “A material or finished product that has served its intended use and has been diverted or recovered from waste destined for disposal, having completed its life as a consumer item. Post-consumer materials are part of the broader category of recovered materials.”

AIM rule defines post-consumer coating as “An architectural coating that has previously been purchased by a consumer or distributed to a consumer but not applied, and reenters the marketplace to be purchased by or distributed to a consumer. Post-consumer coatings include, but are not limited to,

coatings collected during hazardous waste collection programs for repackaging or blending with virgin coating materials.”

Following is consistent with US-EPA CPG.

Green building rating systems often include credit for materials of recycled content and may distinguish allowable credit for post-consumer and post-industrial (or pre-consumer) recycled content. USGBC-LEED™ v3, for example, factors 100 percent of post-consumer recycled content but only 50 percent of pre-consumer (post-industrial) recycled content into calculations for its recycled content materials credit. LEED v3 grants one credit to a project for using materials with recycled content such that the sum of post-consumer recycled content plus one-half of the post-industrial content constitutes at least 10 percent of the total value of the materials in the project; 10% (post-consumer + 1/2 post-industrial). It grants an additional point for 20% (post-consumer + 1/2 post-industrial).

Green Globes US also provides points for reused building materials and components and for building materials with recycled content.

Recycled content is typically determined by calculating the weight of the recycled material divided by the total weight of the product and expressed as a percentage by weight. (The recycled content “value” of a product as assessed under LEED is determined by multiplying the recycled content percentage and the cost of the product.)

Verify with manufacturer for product availability and recycled content.

1. Recycled Content: Minimum **[20] [xxxx]** percent post-consumer recycled content for light colors; minimum **[50] [xxxx]** percent post-consumer recycled content for dark colors.
  2. Toxicity/IEQ: Comply with applicable regulations regarding toxic and hazardous materials, and as specified. Paints and coatings must meet or exceed the VOC and chemical component limits of Green Seal requirements.
    - a. Interior paint: Comply with GS-11.
    - b. Exterior paint: Comply with GS-11.
- B. Specialty Coatings:
1. Radiation Control Coatings: Minimum solar reflectance of cured coating 0.8 and minimum ambient temperature total hemispherical emittance of cured coating at least 0.08 in accordance with ASTM C1483.
  2. Anti-Corrosive Paint: Comply with GS-11.

**SPECIFIER NOTE:**

For current designations under the Federal Biobased Products Preferred Procurement Program (FB4P), refer to [www.biobased.oce.usda.gov](http://www.biobased.oce.usda.gov). As of January 4, 2010, the Federal Register includes designations for approximately 60 product types. The requirements for purchasing biobased items apply to those items directly purchased by the federal agency. Under a construction contract, the contractor's use of hydraulic fluid in its bulldozers and backhoes is incidental to the purpose of its contract, so the contractor is not required to use biobased hydraulic fluids. The Office of the Federal Environmental Executive (OFEE) recommends that agencies encourage the use of these items, however.

Currently designated items that affect construction include:

- Roof Coatings
- Water Tank Coatings
- Adhesive and Mastic Removers
- Composite Panels
- Fertilizers
- Plastic Insulating Foam
- Carpet and Upholstery Cleaners
- Carpets
- Dust Suppressants
- Packaging Films
- Glass Cleaners
- Hydraulic Fluids – Stationary Equipment
- Wood and Concrete Sealers
- Cleaners

The USDA currently has identified about 150 items for which it is collecting test data needed for the additional designations of items that will extend preferred procurement status to include all qualifying biobased products.

- C. Wood and Concrete Sealers
  - 1. Biobased content:
    - a. Membrane Concrete Sealers: Products that are penetrating liquids formulated to protect wood and/or concrete, including masonry and fiber cement siding, from damage caused by insects, moisture, and decaying fungi and to make surfaces water resistant. Concrete sealers that are formulated to form a protective layer on the surface of the substrate. Provide minimum 11% biobased content.
    - b. Penetrating Liquids: Products that are penetrating liquids formulated to protect wood and/or concrete, including masonry and fiber cement siding, from damage caused by insects, moisture, and decaying fungi and to make surfaces water resistant. Wood and concrete sealers that are formulated to penetrate the outer surface of the substrate. Provide minimum 79% biobased content.

### PART 3 - EXECUTION

#### 3.X SITE ENVIRONMENTAL PROCEDURES

- A. Indoor Air Quality: Provide temporary ventilation as specified in Section 01 57 19.11 (01352) – Indoor Air Quality (IAQ) Management.
- B. Waste Management: As specified in Section 01 74 19 (01351) – Construction Waste Management and as follows:
  - 1. Coordinate with manufacturer for **[take-back program]**. Set aside scrap to be returned to manufacturer for recycling into new product. Close and seal all partially used containers of paint to maintain quality as necessary for reuse.

END OF SECTION