



MetroPaint™ and Green Building

Green building focuses on a variety of ways to make the construction and operation of buildings more environmentally sound and sustainable. MetroPaint is an excellent choice for many green building projects, whether they are new construction, renovation or maintenance on housing, or commercial and industrial buildings.

This information sheet addresses MetroPaint's performance on several environmental fronts:

- Volatile Organic Compounds (VOCs)
- LEED™ and other green building certification systems
- Lifecycle benefits

Green building: *the practice of increasing the efficiency with which buildings and their sites use and harvest energy, water and materials, and reducing building impacts on human health and the environment, through better siting, design, construction, operation, maintenance, and removal — the complete building life cycle. (Wikipedia)*

VOLATILE ORGANIC COMPOUNDS (VOCs)

Many green builders are concerned with the VOC content of the paint they use, as they are an important consideration for both environmental and human health impacts.

What are VOCs? VOCs are a class of carbon-based chemicals that have the capacity to evaporate readily at room temperature. They can degrade air quality both in buildings and in the atmosphere. They may produce odors, and they contribute to smog. The health effects of different VOCs vary considerably. The four VOC compounds that are used in the production of latex paint (ethylene glycol, propylene glycol, texanol and butyl carbitol) are all considered low toxicity, though even these can cause nose and throat irritation and other discomfort at high concentrations.

What are EPA limits on VOCs in paints? The U.S. Environmental Protection Agency air quality regulations (40CFR59.400 et. seq.) limit the VOC content of paint. These limits are intended to protect the environment by reducing the creation of photochemical smog in the atmosphere. For the class of paints that includes MetroPaint, the VOC content is limited to 250 grams per liter.

What is the VOC content of MetroPaint? In 2013, Metro tested batches of every color of our paint for VOCs. The VOC content averaged 91 grams per liter (g/L), and no batch was over 118 grams per liter, well under the EPA limit.

What are “Low-VOC” paints? Some manufacturers have developed latex paint products that are lower in VOCs. However, there is no regulatory definition of “Low-VOC,” so the VOC content of paints labeled as Low VOC can vary. Some are simply in compliance with EPA regulations. Others may be significantly lower, some are even close to zero and may be labeled as “No VOC” or “Zero VOC.” Green Seal™, an international standards-setting organization for environmentally preferable products, has established VOC limits for virgin paints in standard GS-11 (www.greenseal.org). Under this standard, flat paints with colorants added must have less than 100 g/L VOCs.

When are Low-VOC paints a good choice? When a building interior is to be painted and there are concerns about indoor air quality, particularly among individuals who are sensitive to odors or chemicals during the first few days after painting. The most significant concentration of VOC vapors occurs within 100 hours after painting.¹

When is MetroPaint a good choice for the environment? MetroPaint’s modest VOC content is appropriate for exterior applications and interior applications other than those with indoor air quality concerns. But VOCs are not the only environmental consideration – there are a number of other environmental benefits provided by recycled paint (see the section on Lifecycle below).

ADDITIONAL NOTES ABOUT VOCs:

- The VOC levels in EPA regulations and Green Seal’s virgin paint standards are intended to apply to paint before it is tinted at the point of sale. Colorants added at the point of sale contain VOCs as carriers. Darker colors in particular can have a lot of colorant added, and thus add a lot of VOCs. Recycled paint is at a disadvantage here, as post-consumer paint contains these colorants. Tinting can add as much as 80 g/L to the VOC content. So the VOC content of MetroPaint would be somewhat lower if it could be calculated the same way.
- Under EPA’s air quality regulations, latex paint recycling is encouraged, and recyclers are allowed to use an “adjusted VOC content” calculation, taking into account the percentage of paint that is recycled from post-consumer sources. If MetroPaint used this calculation, our adjusted VOC content would be between 0 and 68 g/L.
- The Green Seal standard for recycled paints, GS-43, includes the requirement that the VOC content of recycled paints be under 250 g/L. MetroPaint complies with this limit.
- EPA’s VOC regulations are targeted at atmospheric pollution, and not all harmful chemicals are included in their definition of VOCs. So a paint that is labeled as Low or No VOC may still emit some vapors that are harmful to human health. A 2001 EPA study found that “... certain paints marketed as Low VOC may still emit significant quantities of air pollutants” (see *reference footnote 1 below*). In some cases, the overall quantity of VOCs was quite low, but significant amounts of specific compounds were nevertheless emitted.
- The VOCs in recycled paint have already been manufactured and will enter the environment one way or another. When recycled paint is used instead of virgin paint, recycled paint reduces the need to manufacture new VOCs.

¹ An EPA study concludes that the rate of off-gassing of the four VOC compounds found in latex paint can vary considerably depending on the substrate. For non-porous surfaces such as stainless steel, nearly all of the VOCs are emitted within the first 100 hours after painting. In contrast, freshly painted porous surfaces, such as wood or sheetrock, release a relatively small amount of the VOCs in the initial “puff.” They emit the remaining VOCs at very low levels over time, possibly as long as 3.5 years.

However, the study found that even on porous surfaces, the ethylene glycol vapors dropped to under 1 mg/m³ by 100 hours, and down to about 0.1 mg/m³ for most of the long off-gassing process. For comparison, the Occupational Safety and Health

Administration allows occupational exposures of ethylene glycol up to 100 mg/m³. The other three VOCs were found in even smaller amounts after 100 hours, close to the lower limit of the test method's ability to detect.

Reference: Chang, John C.S., "Capstone Report on the Development of a Standard Test Method for VOC Emissions from Interior Latex and Alkyd Paints." US EPA 2001. EPA/600/R-01/093

LEED AND OTHER CERTIFICATIONS

LEED, or Leadership in Energy and Environmental Design, is a benchmarking system developed by the U.S. Green Building Council (www.usgbc.org) to certify high-performance green buildings. Building projects accumulate points toward certification in a variety of different categories. Use of MetroPaint can help garner points for LEED certification in a couple of ways:

- Under the Recycled Content credits (MR4.1/4.2), use of recycled paint can help qualify for credits.
- Under the Regional Materials credits (MR5.1/5.2), use of paint that is manufactured regionally helps gain credits. This is defined as within 500 miles, which includes much of the Pacific Northwest for MetroPaint's Portland-based plant.

In LEED for Homes, credit is specifically awarded for use of recycled paint that is certified by Green Seal. MetroPaint is the first paint recycler in the world to offer Green Seal certified recycled paint. And in the new LEED v. 4, under BPDO (Building Product Disclosure and Optimization), Sourcing Raw Materials Option 2, credit is given for materials manufactured by companies that show extended producer responsibility. That includes MetroPaint.

There are other green building certification systems, such as the guidelines developed by the National Association of Home Builders® (NAHB) for residential construction (www.nahb.org), and the Green Globes system (www.greenglobes.com). These guidelines are similar to LEED in that points are available for both recycled content building materials and regionally-manufactured materials.

LIFECYCLE BENEFITS

For years environmental advocates have been promoting the recycling of various household commodities, such as newspaper, glass, aluminum, etc. Recycling these materials helps reduce the amount of water, raw materials and energy used. Less pollution is generated and less landfill space is used. All of these benefits hold true for recycled paint as well.

Production of new paint generates pollution during the extraction of raw materials, the manufacturing process and the transportation of final products. Every time a gallon of MetroPaint is used instead of a gallon of new paint, a number of benefits are obtained:

- **Significant energy savings and greenhouse gases are reduced.** Embodied energy is the amount of energy it takes to produce a good or service. The embodied energy per pound in new paint is greater than that of any other common construction material, including steel, glass or lumber. This means that when recycled paint is used instead of new paint, significant amounts of energy are conserved and significant reductions in greenhouse gases are achieved. Depending on the assumptions used, lifecycle studies of paint show that use of recycled paint can achieve an energy reduction of up to 90%, eliminating up to 115 pounds of carbon dioxide emissions for every gallon of recycled paint used.

- **Various types of pollution are not generated.** A significant percentage of the ingredients in latex paint are derived from petrochemicals. The extraction of these chemicals results in various environmental impacts, notably air emissions and waste discharges to surface waters. The extraction of titanium dioxide, another important latex paint ingredient, results in the production of significant quantities of sulfuric acid, metal sulfates and metal chlorides. These wastes are commonly disposed of in the ocean or via deep well injection. A 2009 lifecycle study, conducted jointly by the paint industry and government agencies, confirmed that recycling of paint provides significant reductions in a variety of impacts to human health and the environment, such as carcinogens generated, respiratory effects, ecotoxicity, eutrophication and acidification.
- **Less water and fewer raw materials are used.** The extraction of ingredients, the manufacturing process, and transportation of virgin paint require substantial raw materials and water. The relatively simple recycling process uses significantly less. The government/industry lifecycle assessment confirmed that significant reductions in water usage and mineral extraction are obtained with paint recycling.
- **Landfill space is conserved.** At MetroPaint Swan Island, more than 600,000 containers of paint are opened each year. Paint that is recyclable is made into our recycled product, and steel and plastic paint cans and pails are sent to recyclers. This keeps more than 1,000 tons of paint and more than 100 tons of containers out of landfills each year.

THE BOTTOM LINE

MetroPaint provides a number of environmental benefits and can help green building projects get certified. The environmental benefits are so substantial that the independent environmental certifying organization Green Seal has certified MetroPaint.

Ask Metro to learn more about MetroPaint at 503-234-3000 or oregonmetro.gov/metropaint.