

Recycled Paint and Green Building: VOC's and Other Issues

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Recently there has been increasing interest in what is being called the Green Building movement, and its no surprise that the Pacific Northwest is on the leading edge of this movement. Green Building focuses on a variety of ways to make construction and operation of commercial and residential buildings more environmentally sound and sustainable.

The Pacific Northwest also boasts a leading player in the field of paint recycling. The facility operated by Portland Metro will process nearly 200,000 gallons of paint this year, producing a marketable product that is expected to bring in over \$500,000 in revenue. Recycled paint can be surprisingly good quality, while selling for significantly less than virgin paints. It also presents a number of environmental benefits.

The use of recycled materials such as recycled latex paint is one element of Green Building. However there is a potential conflict with another Green Building priority- the presence of VOCs (volatile organic compounds) and other potential contaminants that are sometimes found in recycled paint. Some critics have said that latex paint should not even be recycled, and that low-VOC paint should be used for all applications. Based on Metro's experiences, there are several counter arguments to that point of view:

- Recycling paint reduces landfilling of significant quantities of leftover paint.
- Use of recycled paint reduces the manufacture of virgin paint, which conserves water, raw materials, and energy, and generates less pollution.
- Recycled paint has very modest levels of VOC's.
- Recycled paint has low levels of hazardous constituents such as lead and mercury.
- A paint recycling program can provide community benefits.
- "Low VOC" and "no VOC" are not well-defined terms.
- Low VOC paints can still emit significant quantities of hazardous air pollutants.

Details on each of the arguments follows:

Recycling paint reduces landfilling of significant quantities of leftover paint (and paint cans). Currently Metro's program handles about 200,000 gallons of latex paint annually, of which over 65% is made into "MetroPaint", our 100% recycled content product. On average incoming cans of paint are less than half full, so our program is handling over 440,000 containers of paint each year. Thus we're keeping about 1000 tons of paint and over 200 tons of steel cans out of the landfill every year. The Product Stewardship Institute estimates that there are approximately 40 million gallons of unwanted paint generated nationally each year, of which about 50% is latex. A national recycling program based on Metro's would thus prevent landfilling of 100,000 tons of waste paint and over 20,000 tons of cans.

Use of recycled paint reduces the manufacture of virgin paint, which conserves water, raw materials, and energy, and generates less pollution. Life cycle analysis of latex paint shows significant environmental impacts during the extraction of raw materials, the manufacturing process, and transportation of final products. A significant percentage of the ingredients in latex paint are derived from petrochemicals, the extraction of which 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, wastes which are commonly disposed of in the ocean, or via deep well injection. The paint manufacturing process also uses energy and water and generates pollution, and the transportation of paint products to market uses fuel and generates pollution. Studies of the "embodied energy" of latex paint- the sum of all energy expended during its production & transportation- show 30,000 to 40,000 Btu/pound, which is substantially higher than glass, steel, construction lumber, and other building products.

Recycled paint has very modest levels of VOC's. EPA requirements for VOCs, as well as the more restrictive requirements imposed by local authorities such the South Coast Air Quality Monitoring District (AQMD) in Southern California, are intended to prevent photochemical smog . Twenty-four batches of Metro Paint have been tested for VOCs. Results range from 30 to 100 grams per liter, except for the barn red, which was 115 grams per liter. This is well below EPA requirements, and except for the barn red even meets the more restrictive South Coast AQMD ceiling of 100 grams per liter. Note that the South Coast AQMD rules call for a reduction to 50 grams per liter in 2008, but it is likely that the VOC levels in MetroPaint will steadily decrease over the years as more of the incoming feedstock consists of newer lower VOC paints.

There are also concerns relating to human exposure to VOCs after indoor applications of paint. For this reason there is growing interest in low and no VOC interior latex paints. However the EPA does not have any requirements that address this concern. Green Seal, an independent organization that certifies environmentally sound products, does have standards for VOCs for interior use paints, 50 grams per liter for flat paints, 150 for non-flat. Unfortunately they do not include a definition of flat- by some definitions, such as

the South Coast AQMD, Metro's paint qualifies as flat, while by other standards, such as some paint industry standard web pages, Metro's paint is not flat.

Recycled paint has low levels of hazardous constituents such as lead and mercury.

Lead is limited to 600 ppm (parts per million) in dried paint by the Consumer Product Safety Commission. Metro Paint has been tested for lead 35 times between 1993 and 2002, and every test has shown 25 ppm or less, many with no detectable lead at all, with the exception of our barn red paint. Many paint manufactures still use lead-based pigments to produce red paint, and consequently one sample of barn red tested at 540 ppm.

Although all U.S. paint manufactures stopped using mercury in the early 1990s, the U.S. Environmental Protection Agency allows interior use of paint if mercury is less than 200 ppm, and has no stated limit on exterior use. Metro Paint has been tested 35 times between 1993 and 2002. The average mercury level is 23 ppm, the highest level recorded was 122 ppm, all well below the EPA limit.

Eleven batches of Metro Paint have been tested for a variety of other metals and organic compounds between 1993 and 2002. Only metals and organic compounds that are expected as a part of the paint manufacturing process were detected.

A paint recycling program can provide community benefits. One benefit is the ability to provide low cost paint for non-profit organizations and government agencies, many of which are facing serious funding shortages and might not be able to afford paint at all unless it is low cost recycled paint. Another possible benefit is the potential to reduce the financial impact of paint disposal, and possibly even bring in extra revenue. The net cost of Metro's paint recycling program, when revenue is taken into account, is lower than any other option for managing the paint collected in our HHW program. Projections for the program's future show that revenue may soon cover all direct and indirect costs, and will in fact provide extra revenue for use in other important agency programs.

“Low VOC” and “no VOC” are not well-defined terms. An internet search for suppliers of low-VOC paints shows that a variety of definitions are in use for the term “low-VOC”. Some suppliers use the term in connection with any paint that complies with the lower limits found in recent air quality regulations. Even the South Coast AQMD defines low VOC as 51-250 grams/liter. None of the suppliers specifically mentioned the Green Seal interior VOC standards, though some low-VOC paints were 50 grams/liter or less. “No-VOC” is also a tricky term- in fact the South Coast AQMD defines “no VOC” as 50 grams/liter or less. Some of the samples of MetroPaint would even meet this definition. In addition, several sources indicate that the standard EPA testing protocol for VOC levels does not provide accurate results at low levels, and that many paints which test as having no VOCs under this test actually have some VOCs when tested by more accurate methods.

Low VOC paints can still emit significant quantities of hazardous air pollutants. A recent EPA study found that “. . .certain paints marketed as low-VOC may still emit significant quantities of air pollutants” (US EPA: Capstone Report on the Development of a Standard Test for VOC Emissions from Interior Latex and Alkyd Paints, October 2001). In some cases the overall quantity of VOCs was quite low, but significant amounts of specific compounds were nevertheless emitted. Manufactures of low VOC often suggest that it is not necessary to evacuate occupants, even potentially sensitive occupants such as hospital patients, when low VOC paint is applied, but the EPA study raises serious concerns about the possible health effects from emissions found in several brands of low VOC paint.

Conclusion

There are legitimate concerns about the health effects of VOCs emitted by freshly-applied latex paint. Use of a paint that is truly very low in VOCs will be the right choice for interior applications when there are concerns about exposure to occupants while the paint is drying, especially occupants that may be particularly sensitive. However many paints that are marketed as low-VOC do have significant quantities of VOCs, or emit significant quantities of potentially hazardous compounds. In exterior applications, as well as interior applications where there are not exposure concerns, recycled paint is a choice that is safe for the environment and people, and can provide substantial environmental and community benefits.