



Evaluating Less Toxic Paints and Coatings?

GET THE MOST FOR YOUR MONEY BY CALCULATING TRUE COSTS

Ecology Fact Sheet

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Many of the paints and coatings used by industry contain a variety of Hazardous Air Pollutants (HAP), chemicals which are considered toxic and are dangerous to human health and the environment. Federal, state and local agencies regulate the use of these toxic substances, which often requires businesses to identify less toxic alternatives.

Informed decisions about coating alternatives can be made by applying a simple cost comparison between coatings that you use currently and less toxic alternative products.

Introduction: What Is Pollution Prevention?

Pollution prevention (P2) is any practice that reduces or eliminates pollution at the source. Pollution is prevented through increased efficiency in the use of raw materials, energy, water and other resources; and through reducing or eliminating the use of hazardous substances in the production process. Activities for implementing P2 include:

- Equipment or technology modification;
- Process modifications;
- Reformulation or redesign of products;
- Substitution of raw materials;
- Improvements in housekeeping, maintenance, training or inventory control.

A process for comparing alternatives when considering alternative raw materials is detailed below.

Substitution of Paint and Coating Materials

There are many factors that need to be taken into account before substituting alternative paint and coating materials. Customer specifications and production requirements need to be met, costs minimized and employees familiarized with the change. This fact sheet focuses on the raw materials cost element of evaluating a switch to an alternative coating. The step-by-step cost comparison process described below will help you figure raw material costs of your manufactured product. (*Note: The process described below only covers raw material costs. Other costs of using toxic paint and coating products, such as worker exposure and regulatory liability, also must be considered.*)

Determine Costs Per Volume of Paint Solids NOT Price Per Gallon

If you simply look at price per gallon, alternative coatings often seem more expensive. Price per gallon, however, does not tell the whole story. You can only determine true costs by calculating how much the coating costs per unit of painted product. Once this calculation is completed, you can make a more informed decision on whether to purchase a substitute coating product.

Step 1: Figure Cost of Paint Solids

Conventional solvent-based liquid paints include both volatile and solid components. When the paint is applied, the volatile components evaporate and the solids are left behind on the surface of your manufactured product. The cost of that solid fraction is what you need to figure to accurately compare the costs of coating products. The cost of the solid fraction can be calculated from information provided in the product's Material Safety Data Sheet (MSDS) or Product Data Sheet (PDS), which are available from manufacturers. The paint's total per-gallon cost is divided by the solids percentage to obtain the cost per gallon of solids.



Example : If a paint product costs \$15 per gallon and contains 33 percent solids then you would divide 15 by .33. 15 divided by .33 = \$45.45, the cost per gallon of the paint solids.

Step 2: Figure Ideal Paint Cost Per Square Foot

If a desired thickness is known, this cost can be further refined into a cost per unit of painted surface area using the following formula: (Cost of paint solids per gallon) x (film thickness in mils) x (0.0006233)

Example :(\$45.45 per gallon of solids) x (2 mils finished film thickness) x (0.0006233 conversion factor) = 5.7 cents per square foot, assuming an ideal 100 percent transfer efficiency.

Step 3: Figure Actual Paint Cost Per Square Foot

However, 100 percent transfer efficiency is almost never achieved when applying liquid coatings with spray equipment. To calculate a more accurate cost of using a liquid coating, the transfer efficiency of the application equipment and paint product must be considered.

In most spray painting operations, only a portion of the product that is sprayed actually reaches the surface to be coated. The remainder, or overspray, is collected in the paint booth exhaust filters or settles to the floor of the paint area. The amount of paint reaching the product versus the total amount of paint sprayed is referred to as transfer efficiency. To calculate the actual cost of paint per square foot of applied finish, the estimated transfer efficiency of the paint operation must be factored into the cost formula as follows:

Coating Change Cuts Production, Regulatory Costs

A Seattle-based company investigated low-solvent coatings to avoid the Title V Air Operating Permit process. Avoiding the permit and its costs was the primary motivator, but the company did not want increased painting costs either. The company was using a \$13-per-gallon paint with 35% solids content and had identified an adequate replacement paint that cost \$20 per gallon and had 60% solids content. The com-

pany applied the formula detailed on this fact sheet to compare the cost of paint as it is applied to parts rather than compare the cost per gallon. Calculations showed the low-solids paint cost \$2.31 per square foot, while the high-solids paint would cost only \$2.08 per square foot. The company paints 50 square feet of surface area per part. Switching coatings saved the company \$1.50 per part.

ideal (100% transfer efficiency) paint cost per square foot divided by transfer efficiency percentage = actual paint cost per square foot.

Example :A paint operation has an estimated transfer efficiency of 50%. Take the 5.7 cents calculated for 100% transfer efficiency and divide by .50 to determine actual coating cost. (5.7 cents per square foot) divided by (.50 transfer efficiency) = 11.4 cents per square foot.

Step 4: Figure Total Cost of Painting Manufactured Product

Now that a cost estimate per square foot has been determined, you can apply this to figure an estimated cost per painted part.

Example : A flat panel part has an area of 10 square feet. Multiply your cost per square foot times the square footage of the part. (11.4 cents per square foot) x (10 square feet) = \$1.14 per part. (Note :For parts that are oddly configured, estimate square footage.)

WHO TO CALL FOR HELP

Through the Washington Department of Ecology's Compliance Assistance Office, non-enforcement assistance is available for small businesses with air quality questions. Program purposes are to:

- Explain air quality rules and recommend ways to comply;
- Provide free, on-site technical assistance visits;
- Help businesses estimate their air pollution emissions;
- Refer businesses to needed resources;

- Provide information on potential financing sources for compliance requirements.

**For information, contact:
Compliance Assistance**

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