Preventing Air Pollution from: Paint and Coating Manufacturing

Did you know...

One manufacturer successfully replaced lead pigments used for corrosion resistance with yttrium, which is 100 times safer as a dust than lead at typical levels of use. Use of yttrium in the coating also eliminates the need for a chrome pretreatment in the finishing process. Use of the yttrium coating should eliminate up to 1 million pounds of lead in this coating application over the next several years.

—PPG Industries

What is pollution prevention?
Pollution prevention is the use of materials, processes, or practices that reduce or eliminate pollution and waste at the source. It includes improved operating practices like materials substitution, process and equipment modifications, and energy and water conservation.

Why should paint and coating manufacturers prevent pollution?
Pollution prevention practices save money on waste disposal, product usage, and air pollution controls.

It also safeguards the health of your employees, customers, and the community. For example, particle pollution (dust) from pigment grinding may be tracked out of the plant and into the community.

Why should I be concerned about air pollution from paint and coating manufacturing?

• Mixing and cleaning operations can release volatile organic compounds (VOC) and some toxic air pollutants. Chemicals in these substances can also react in the air to form ground level ozone (smog), which has been linked to a number of respiratory effects. Ozone continues to be a pollution problem in many areas of the United States.

• Pigment grinding and milling emit particle pollution, which can contain heavy metals and other toxic air pollutants, some of which can cause cancer.

How can I reduce pollution from my paint and coating manufacturing facility?

Change Products
• Eliminate the use of heavy metals such as chromium, lead and mercury in coating mixtures. Non-hazardous biocides are available to replace mercury-containing coatings designed to kill bacteria.

• Reformulate coatings to higher solids coatings, waterborne coatings, powder coatings, or ultra-violet (UV) light cured coatings.

Reduce Emissions
• Cover tanks during blending, mixing, and while waiting to transfer the paint or coating into packaging.

• Cover tanks with durable fabric covers or standard plywood to reduce leakage of fumes.

• Securely cover all materials to reduce the chance of spills when transferring materials.

Change Cleaning Procedures
• Mandate a “clean as you go” policy to reduce the amount of solvent needed for removing heavy build-up.

• Clean tanks manually with a wiper or squeegee rather than with solvents.

Replacing the lid on a solvent storage tank cost one manufacturer $500, but netted an annual savings of $9,604.
• Use a high pressure spray hose to clean tanks. This reduces the amount of solvent needed.
• Reuse cleaning solution or solvent. For example, use dirty solvent for initial cleaning, then follow with clean solvent.
• Use cleaners with a low-VOC and toxic air pollutant content, such as water-based cleaners.
• Dedicate equipment to a single product, or family of products that are similarly colored, to reduce the need for equipment cleaning between batches.

Recycle Materials
• Use an onsite distillation unit to clean dirty cleaning liquid. This makes the solvent available for reuse in the production process. An onsite distillation unit reduces the costs of both solvent disposal and fresh solvent purchase.
• Reuse dust captured by a baghouse during pigment grinding.
• Set up, or participate in, a paint exchange program where consumers/customers return unused paint that can be reworked into future products.
• Rework or blend off-specification materials into new products.

Reduce or Eliminate Toxic Emissions
• Reduce emissions of particle pollution by using a baghouse to collect dust.
• Use pigments in a slurry or paste instead of in dry form to minimize dust.
• Grind or mix raw ingredients with sandmills instead of ballmills. Sandmills are more efficient and require less solvent for cleanup.

Upgrading equipment and reformulating paint may be better, but how expensive is it?
Though reformulating coatings or using new or different processes may be more expensive, raw material costs may decrease. Also, these coatings reduce the amount of toxic air pollutants emitted at your facility and at facilities using the coatings.

If you decide to upgrade the equipment in your facility, assess its financial condition, your cash-on-hand available to purchase equipment, and your ability to borrow to finance new equipment. Also, check with your state and/or local pollution prevention office for funding possibilities.

How can I inform my customers about reformulated paints?
Users of reformulated paints and coatings may not have used these types of paints before and may require training to inform them that these paints and coatings will have the same functionality as conventional formulations.

Provide workshops and/or information about the advantages and disadvantages of reformulated paints and coatings. Emphasize reductions in toxic air pollutant emissions, safety hazards, and the use of potentially toxic solvents.

Also, sponsor, and/or participate in, a paint exchange program where customers can return paints to be reworked into other paints.

What else can I do to reduce pollution?
Many state/local pollution prevention offices offer free, on-site assessments for interested businesses. A list of these small business assistance programs can be found at www.epa.gov/smallbusiness. This site provides information about assistance and technical help, environmental experts, environmental regulations and laws, funding, and saving money.

Also, sponsoring employee awards for good ideas, great efforts, and dedication to pollution prevention. For example, you could provide a cash award for workers who not only a cost-saving work practice but one that reduces pollution as well.

Waterborne alkyd resins are available that reduce solvent use by 50%, and have performance equal to conventional formulations. They cost more, but result in overall cost savings because of decreased solvent use.
For Further Information

- Fact Sheet:  www.carbohydrateeconomy.org/library/admin/uploadedfiles/Biochemical_Substitutions_in_the_Paint_Industr.html
- Resource Center:  www.paintcenter.org

Pollution Prevention
- Assessment and guidance:  www.ecy.wa.gov/pubs/98410.pdf
- Options:  dep.state.ct.us/wst/p2/industry/optindex.htm

One paint manufacturer recycles and reuses 95% of the solvent used in the cleanup process. The company estimated that it would generate $9,600 annually in savings from reductions in waste generation and solvent consumption.
—The Carbohydrate Economy Clearinghouse