Pollution Prevention Opportunities Checklist

The following material was produced by the Northeast Waste Management Officials' Association's (NEWMOA) in its complete original form as part of manual, Metal Painting and Coating Operations. The U.S. Environmental Protection Agency Pollution Prevention Division funded the manual as a model of a comprehensive packet of pollution prevention (P2) information on a single industry.

Significant amounts of pollutants are generated from paint and coatings processes. The exact amount for the nation is difficult to calculate, because use is spread across numerous industry groups (EPA, p. 158), and companies do not report emissions by manufacturing process to EPA. Wastes from paint application include leftover paints, dirty thinner from the cleaning of spray guns and paint cups, air emissions of VOCs and HAPs, dirty spray booth filters, dirty rags, debris from area wash downs, and outdated supplies. Simple and cost-effective ways to reduce these wastes include rigid inventory control, good housekeeping practices, proper paint mixing, increased operator training, high transfer efficiency equipment, proper cleaning methods, alternative coatings, reusable paint booth filters, recycling solvents, and the use of waste exchanges (KSBEAP, p. 21). This chapter presents an overview of these techniques while detailed information on specific technologies are covered in subsequent chapters. Table 7 presents a broad overview of pollution prevention opportunities in coating operations.

Table 7. P2 Options for Coatings Processes (KSBEAP, p. 23. and IHWRIC, p. 39-40)

P2 Options	Description	Benefits
Use Low-VOC Paint	• Substitute waterborne, powder, UV curable or hight-solids paints for solvent-borne paint • Use paints that have less toxic pigments	• Reduces VOC Emissions • Reduces toxicity of paint sludge
Increase Transfer Efficiency	• Use electrostatic spraying • Use flow coating, roller coating, or electrodeposition • Improve operating practices • Provide operator training	• Reduces paint loss due to overspray
Reduce Quantity and Toxicity of Solutions Used for Surface Preparation	• Reduce solvent evaporation by installing tank lids, increasing freeboard space, and installing freeboard chillers in conventional solvent vapor degreasing units • Use aqueous solutions or mechanical methods • Maximize mechanical or aqueous cleaning processes	• Reduces spent solvents, aqueous solutions and rinsewater from surface preparation • Reduces VOC emissions

P2 Options	Description	Benefits
Reduce Equipment Cleaning Waste	• Use less toxic solvents • Install gun washer • Adopt distillation/recycling practices • Use enclosed cleaning devices	• Reduces VOC emissions • Reduces toxicity of cleaning wastes
Adopt Better Housekeeping Practices	• Segregate waste streams • Implement rigid inventory control • Improve material handling and storage • Mix paint according to need; document use • Schedule jobs to maximize color runs • Perform preventative maintenance • Practice emergency preparedness	• Reduces paint waste • Reduces solvent use • Reduces leaks and spills

Rigid Inventory Control

Rigid inventory control is an efficient and effective way of reducing indiscriminate use of raw materials. The facility should monitor employee operations and make verbal or written comments on product use. Another option is to limit employee access to storage areas containing raw materials. This inaccessibility can force employees to stretch the use of raw materials (EPAr, p.8). Rigid control can reduce solvent use by as much as 50%.

Good Housekeeping

Improvements in better operating practices, or "good housekeeping" methods apply to all emissions and waste streams, require minimal capital outlays, and can be very effective in reducing wastes and pollutants. Good housekeeping includes the development of management initiatives to increase employee awareness of the need for, and benefits of: pollution prevention; preventative maintenance to reduce the number of leaks and spills; and efficient use of raw materials. Table 6 presents a summary of good housekeeping measures that are described in detail in this chapter

Table 6. Opportunities for Improved Housekeeping in Coating Operations (KSBEAP, p. 21)

Waste	Method
General	• Improve material handling and storage to avoid spills • Segregate waste streams • Perform preventative maintenance • Practice emergency preparedness • Charge departments generating waste for costs associated with management and disposal

Waste	Method
Paint Waste	• Maintain rigid inventory control to reduce thinner use • Initiate routine maintenance and training to reduce leaks and spills • Mix paint according to need; document use • Provide operator training to improve transfer efficiency • Schedule jobs to maximize color runs
Solvent Waste	• Control inventory to reduce use • Substitute coating material for one with low or no solvents • Substitute cleaning solution for one with low or no solvents • Practice proper equipment cleaning methods • Recycle solvents onsite

Many methods are available to control and minimize material losses. The following approaches to bulk material drum consolidation, material transfer methods, evaporation, and drum transport can effectively limit material loss:

- Control inventory by storing drums together in an area of limited accessibility
- Reduce leaks and spills by placing drums at points of highest use
- Use spigots or pumps to transfer materials from storage containers to "working" containers
- Control evaporation by using tight-fitting lids and spigots
- Use drip pans
- Use secondary containment in bulk storage areas
- Move drums correctly to prevent damage or punctures that could lead to leaks or ruptures during future use (EPAr, p.8).

Paint Mixing

In many cases, facilities will mix a fixed amount of paint for each job (e.g., one pint or one quart). For small jobs especially, the amount of paint prepared often exceeds the amount of paint actually applied. Facilities can encourage the use of the correct amount of paint by having various sizes of paint-mixing and sprayer cups available to limit overmixing. Any paint not used for a job is usually considered a hazardous waste and should be disposed of as such. A disadvantage to this technique is that if too little paint is mixed for the job and more needs to be made, color matching can be difficult (EPAr, p. 9).

Operator Training

Operators may be skilled in producing high quality finishes but poorly trained in minimizing paint use. Technical assistance providers can help operators by teaching them to:

- Avoid arcing the spray gun and blowing paint into the air
- Maintain a fixed distance from the painted surface while triggering the gun

- Keep air pressure (which is often set too high) low; this can increase transfer efficiency by 30 to 60%
- Keep the gun perpendicular to the surface being painted
- Use proper on/off trigger technique (KSBEAP, p.23)

High Transfer Efficiency Equipment

Less overspray means reduced emissions. Transfer efficiency is a measure of how much paint actually goes on the product, compared to how much paint is sprayed. Typical transfer efficiency from conventional guns ranges from 20 to 40%, making average overspray rates 60 to 80%. For more information on high transfer efficiency equipment, refer to chapter 7.

Alternative Coatings

Painting usually consists of applying a primer/surfacer followed by one or more coats of paint. VOC emissions are directly related to the types of paints used. Technical assistance programs should assist companies in identifying any potential alternative coatings such as powder, waterborne, or high-solids coatings. For more information on alternative coatings, refer to chapter 6.

Proper Cleaning Methods

Reducing solvent use in equipment cleaning can significantly reduce pollution. This can include:

- Scraping paint cups or tanks before rinsing with solvent
- Making use of Teflon-lined metal paint containers that are easier to clean
- Using an enclosed gun-cleaning station
- Spraying solvent through the gun into the cleaning station where it is condensed for recovery and reuse
- Scheduling jobs so that large batches of similar items are painted instead of scheduling jobs so that small batches of custom items are painted. This reduces the amount of solvent and waste paint generated
- Scheduling jobs from light to dark colors to minimize cleaning between colors (EPA, p.10)

For more information on proper equipment cleaning methods, refer to chapter 8.

Filters

Reducing the amount of filters used in painting can reduce hazardous waste generation. Facilities should handle filters as a hazardous waste if they contain wet paint (e.g., solvents), due to their flammability and the existence of toxics in the paint. One method for reducing filter waste is to use a cleanable polystyrene filter or a reusable metal filter. When the filter is too clogged for use, it can be cleaned by blowing compressed air over the filter until it is clean enough for reuse (paint removed in this process would require collection and may still be classified as a hazardous waste) (EPAr, p. 13).

On-site Solvent Recycling

Several alternatives are available for recycling solvents onsite. Gravity separation is inexpensive and relatively easy to implement. This technique enables a solvent/sludge mixture to separate under quiescent conditions. The clear solvent can be decanted with a drum pump and used for equipment cleaning. This reduces the amount of wash solvent purchased. Reclaimed solvent also can be used for formulating primers and base coats, but might create problems if it is not sufficiently pure.

For those facilities that generate large quantities of waste solvent, on-site distillation may provide a more cost-effective solution. Batch distillation of all high-grade solvent wastes can virtually eliminate the need to purchase lower-quality solvents used in priming and cleaning operations. An operator can reclaim 4.5 gallons of thinner, with 0.5 gallons left as sludge. This ratio will vary depending on the specific operation (EPAr, p. 11). For more information on solvent distillation, refer to chapter 5.

Waste exchanges provide another alternative for reducing waste disposal costs. Waste exchanges are organizations that manage or arrange for the transfer of wastes between companies, where one producer's waste becomes another producer's feedstock. Most exchanges exist as information clearinghouses that provide information on available wastes. Opportunities exist for these exchanges to oversee direct transfer (without processing) of waste solvents from one company to another (KSBEAP, p. 24).

Contact Pinellas County's Pollution Prevention and Resource Recovery (P2R2) Program at 464-4761
for Waste Reduction Assistance

Surface Coating
Pollution Prevention Opportunities Checklist

The following items are excerpts from the Spokane County Air Pollution Control Authority's (SCAPCA) *Air Quality Compliance Self-Inspection Checklist.* The checklist in its entirety is located at http://www.scapca.org/coating_checklist.html. The checklist in its original form is produced by:

1. Does all surface coating take place in a booth or room equipped with a particulate control system capable of capturing all visible overspray ___Yes, ___No, ___NA

2. Does your paint booth or room exhaust through an unobstructed vertical stack (no caps, elbows, etc.)? ___Yes, ___No, ___NA

3. Is your spray gun totally enclosed during clean-up, or is solvent flushed through the gun into a container which is immediately sealed? ___Yes, ___No, ___NA

4. Are all coating and solvent containers tightly sealed when not in use? ___Yes, ___No, ___NA

5. Are all solvent containing wastes stored in tightly sealed containers until disposal? ___Yes, ___No, ___NA

6. Are solvent rags kept in tightly sealed containers when not in use? ___Yes, ___No, ___NA

7. Are spills of solvent containing material cleaned up upon discovery? ___Yes, ___No, ___NA

8. Are the most current MSDS kept for materials used, and are they available upon request? ___Yes, ___No, ___NA

9. Are you properly operating your pressure drop gauge (i.e., is it checked to insure that it is zeroed before the booth is turned on)? ___Yes, ___No, ___NA

10. Are filters seated in filter housing such that there are no gaps between the filter and the housing? ___Yes, ___No, ___NA

11. If you operate a water wash booth, is the water level maintained to adequately filter exhaust air? ___Yes, ___No, ___NA

12. If you operate a water wash booth, is the water curtain continuous all the way across the booth wall with no flow inconsistencies or gaps? ___Yes, ___No, ___NA

13. Are visible emissions and overspray NOT observed from the exhaust stack? ___Yes, ___No, ___NA

14. Are you performing pressure drop readings, filter changes, visual observations of filter media condition, and other manufacturer-recommended booth maintenance? ___Yes, ___No, ___NA

15. Are all maintenance activities recorded on a maintenance log? ___Yes, ___No, ___NA

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