

A Cooperative Project  
between the  
U.S. Environmental  
Protection Agency  
and the  
Printing Trade  
Associations  
Nationwide

July 1996

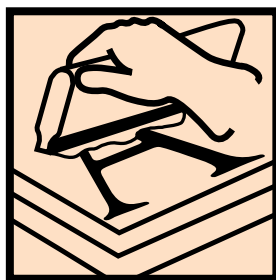
EPA 742-F-95-010



# design FOR THE ENVIRONMENT

SCREEN PRINTING PROJECT BULLETIN 3

## SCREEN PRINTING



from a survey of screen printers, DfE identified many alternative workplace practices that participants found helped them prevent pollution while reducing chemical exposures and screen cleaning costs.

This bulletin describes simple changes in screen reclamation work practices that have resulted in significant reductions in costs, environmental impact and worker exposures. Although this bulletin concentrates on preventing pollution in the screen reclamation process, it highlights a basic framework for pollution prevention through improved work practices that can be applied to any process in your shop.

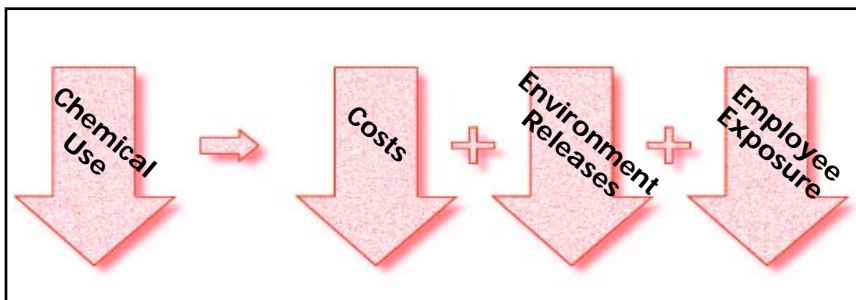
### Work Practice Alternatives for Screen Reclamation

### Background

A survey of screen printers (conducted by the screen printing trade association) determined that almost 36 percent of the respondents had implemented changes in workplace practices to reduce their use of ink removal or screen cleaning/reclamation products. With little or no capital expenditures, pollution prevention through improved workplace practices can result in cost savings through the reduced use of materials, lower waste disposal costs, less worker exposure and other benefits. Improving work practices to prevent pollution is simply a common-sense approach to running a print shop.

The Design for the Environment (DfE) Screen Printing Project is a voluntary cooperative effort between the screen printing industry and the U.S. Environmental Protection Agency (EPA) dedicated to helping screen printers improve their efforts to reduce risk to their workers and the environment in cost effective ways.

Printers, EPA, product manufacturers, and the screen printing trade association are all concerned with minimizing the environmental and health hazards of screen reclamation. Through the DfE Screen Printing Project, these groups are working together to identify and share information on alternative screen reclamation work practices and to evaluate alternative screen reclamation products. Using information



Increase the Benefits by Reducing Your Chemical Use



## Getting Started

The first step in a pollution prevention program is to examine your process and identify the waste generated by each process step, any inefficient use of resources, and areas where improvements can be made. This examination can be accomplished through an in-house process evaluation. Undertaking a process evaluation involves observing, measuring, and recording data on the materials used and waste generated in your shop. This information will then allow you to take a comprehensive look at your facility and to focus your attention on areas where waste reduction and cost savings are most easily accomplished. After your initial evaluation, periodic in-house evaluations will help you determine the effectiveness of alternative products and practices being implemented. The process evaluation results should be shared with all employees to raise employee awareness about the benefits of the pollution prevention program, to provide them with feedback on pollution prevention progress, and to get their input on improvements. In-house evaluations can give both operators and managers the incentive to strive for continuous improvement.

## How Everyone Can Help

### Process Improvements

After obtaining a good understanding of your material flows and waste streams through a process evaluation, you should identify your opportunities for pollution prevention. While the materials use and waste generation are different in every shop, and solutions particular to your operation may need to be

developed, many of the printers contacted through the survey found similar pollution prevention solutions to be effective, including:

#### Keep chemicals in safety cans or covered containers.

This minimizes chemical losses from evaporation and spills.

#### Use plunger cans, squeeze bottles, or specialized spraying equipment to apply chemicals.

The use of such equipment can reduce materials and accidental spills.

#### Use manual spot application of screen reclamation chemicals and alternative rinses.

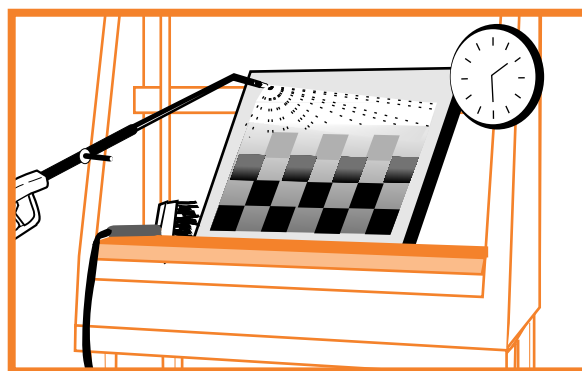
One printer reduced chemicals use for screen cleaning 15% by using spot application of ink degradant, and a low pressure rinse, followed by a high pressure water blast.

#### Reuse shop towels to reduce ink remover use.

If using towels for ink removal, reuse the towel from the last pass of one screen for the first pass on the next screen. This will reduce the number of towels disposed of or sent to the laundry service.

#### Try increasing your water dilution.

Some printers have been able to dilute their screen reclamation products without reducing performance.



Avoid delays in reclaiming screens

#### Avoid delays in cleaning and reclaiming screens.

If screens are cleaned promptly, the chemicals needed to remove ink, emulsion, and haze can be reduced.

#### Recover solvent from rags for reuse.

Some printers realized significant savings in their chemical costs by recovering solvent from used rags either by gravity draining, wringing the solvent into a covered container, or using an explosion-proof centrifuge.

#### Recover used cleaning product and chemical overspray for reuse.

One printer found that used cleaning chemicals could be captured, treated in a small still to remove pigments, and then used again. Another printer found that installing a simple "catching frame" around each screen to capture overspray during chemical application steps allowed significant amount of chemical to be reused.

PROCESS EVALUATION		
Activity	Waste	Reduction Ideas
Dip rag in Ink Remover (IR)	IR evaporates IR drips	Apply with spray bottle
	Rags are hazardous waste	Centrifuge rags

Evaluate Your Process



## Materials Management and Inventory Control

Many printers have found that proper materials management and inventory control cut both the amount of chemicals used and their screen cleaning costs. Keeping track of chemical usage clarifies materials flow, how it relates to waste generation rates, and where pollution prevention opportunities can be implemented. Materials management and inventory control techniques used by many printers to help reduce material use and disposal include:

### Manage inventories on a first-in, first-out basis.

This will minimize the disposal of expired materials.

### Maintain accurate logs of your chemical and materials stock, use and waste generation rates.

This will help you evaluate your shop's materials flow and identify where wastes are being generated.

### Minimize the amount of chemicals in the production area.

This will encourage materials conservation.

### Keep all wastes separate and in clearly marked containers.

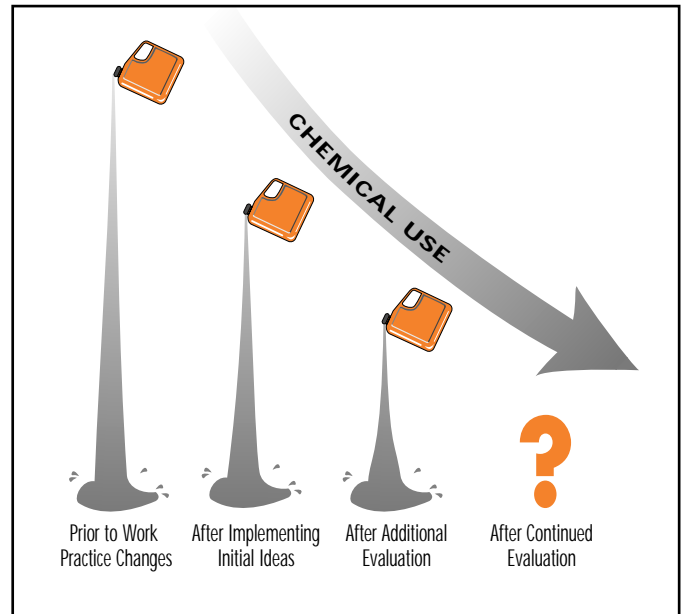
This allows wastes to be reused or recycled, and prevents hazardous wastes from contaminating non-hazardous wastes.

## Keeping it Going

According to many printers, a reluctance to change to alternative screen cleaning products or work practices is one of the largest obstacles to pollution prevention in their shops. Much of this unwillingness to try new products, technologies, and procedures arises from employees' lack of awareness of the benefits and a belief that the alternatives will not work. Training on health and safety issues and on materials handling and disposal procedures will help employees understand both the benefits of proper materials handling and disposal and the potential consequences of improper workplace practices to their health and safety, the environment, and company profitability.

**Seek your employees' input on pollution prevention activities to encourage their participation; the people closest to the process often come up with the most creative approaches to pollution prevention.**

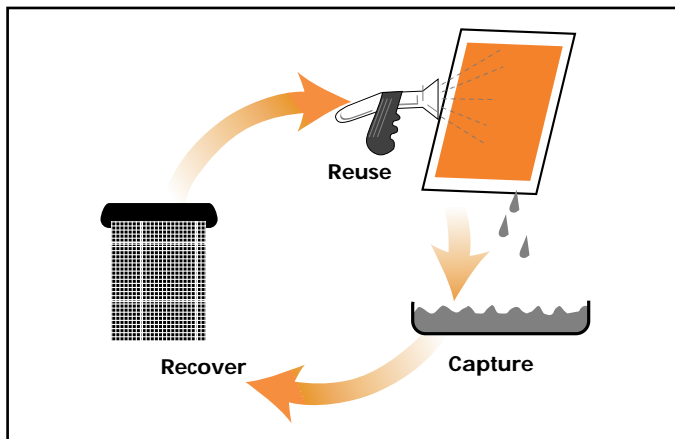
**est to the process often come up with the most creative approaches to pollution prevention.** Awareness of materials use and waste generation can be fostered by centralizing the responsibility for storing and distributing chemicals, by making employees accountable for the waste they generate, and by providing incentives for waste reductions.



## Reduce Your Chemical Use Through Continuous Improvements

It is important that employees are aware of your company's commitment to environmental goals and pollution prevention. Depending on the company size, it may be helpful to prepare a written environmental policy and written procedures on proper equipment operation, maintenance, and materials handling and disposal. Providing feedback to employees on materials handling, disposal and pollution prevention performance re-emphasizes your commitment to pollution prevention and encourages your employees to continue to improve their workplace practices.

Finally, pollution prevention should be an ongoing process where work practices are monitored regularly to ensure that improved practices already identified are actually being implemented on the shop floor, and that new opportunities for pollution prevention are being identified continuously.



## Reuse Your Reclamation Chemicals

### ***What is the Design for the Environment Screen Printing Project?***

U.S. Environmental Protection Agency's (EPA) Design for the Environment (DfE) Screen Printing Project is a voluntary project that encourages printers to consider environmental concerns along with cost and performance when purchasing materials. Replacing hazardous chemicals with environmentally-safer substitutes is one way to reduce the impact of printing on the environment while maintaining product quality. Many printers, however, may not have the time to identify and test environmentally-safer substitutes.

That's where DfE fills the gap. EPA has teamed up with screen printing industry representatives (including trade associations, printers, and suppliers) in the DfE Screen Printing Project. The Project's goal is to evaluate and publicize pollution prevention opportunities in screen printing, particularly in the screen reclamation process.

### ***For More Information...***

For more detailed information on technological and chemical alternatives for screen reclamation, see the DfE Screen Printing Project summary booklet, *Designing Solutions for Screen Printers — An Evaluation of Screen Reclamation Systems*. Additional case studies and other bulletins summarizing the evaluation of screen reclamation alternatives are also available.

For copies of this bulletin, other DfE Screen Printing Project materials, or for more information about the project, please contact:

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or

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10015 Main Street  
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You may also contact the DfE Home Page at:  
<http://www.epa.gov/dfe> or the SGIA  
Home Page at <http://www.sgia.org/>



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