



# Your Screen Reclamation System

- ◆ How safe is it for workers to use?
- ◆ How well does it perform?
- ◆ How safe is it for the environment?
- ◆ How much does it cost to use?



## Ink removers, emulsion removers, haze removers...

As a screen printer, you know that there are many different chemicals you can use to reclaim your screens. You want to use the chemicals that are best for your shop—*products that perform well, are cost effective, and just as important, are safe for workers to use.*

Of course, no printer can possibly evaluate all the products available. So, to help you, the Design for the Environment (DfE) Screen Printing Project has published the booklet ***Designing Solutions for Screen Printers: An Evaluation of Screen Reclamation Systems***. This easy-to-read 52-page booklet summarizes the (1) chemical composition, (2) performance, (3) cost, (4) risk and exposure, and (5) regulatory concerns of 16 different screen reclamation systems. . . . .

### LOOK INSIDE

for details about  
how *Designing  
Solutions for Screen  
Printers: An  
Evaluation of  
Screen Reclamation  
Systems* can help  
you evaluate *your*  
screen reclamation  
system!

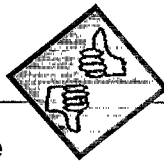
# System profiles in *Designing Solutions for Screen Printers* des

This information can help you examine your



## Chemical Composition

The chemicals that are found in each component of a system—ink remover, emulsion remover, haze remover—are listed here. This information can help you answer questions about your own reclamation system and identify substitute products you may wish to try.



## Performance

Use this information to help you find out if a particular system may be right for your shop.

Each system was tested (1) in a controlled laboratory environment and (2) under actual production conditions in a print shop (a volunteer demonstration site). The opinions of the printers that used the systems are documented, as are the results of the specific lab tests. For each demonstration site, the type of ink used on the screens to be reclaimed, as well as the number and size of screens cleaned by the facility during the demonstration project, are listed.

Comparing the production conditions of your shop to those of the demonstration site will help you assess the performance information.

## Product System Epsilon (Method 2)

### Chemical Composition



Ink Remover	Cyclohexanone Propylene glycol series ethers Diphenyl glycol Benzyl alcohol Diacetone alcohol Aromatic solvent naphtha Deionized plant oil VOC: 63% Vapor Pressure: Unknown	
Emulsion Remover	Sodium peroxide Sulfate salt Water VOC: 0% Vapor Pressure: Unknown	
Haze Remover	Alkyl benzene sulfonates Ethoxylated nonylphenol Phosphate salt Pinif/kausite Deionized plant oil Water Cyclohexanone	Propylene glycol series ethers Diphenyl glycol Benzyl alcohol Diacetone alcohol Aromatic solvent naphtha VOC: Unknown Vapor Pressure: Unknown

### Performance



Product System Epsilon consists of an ink remover, an emulsion remover, and a haze remover. It was demonstrated at two facilities, both of which used solvent-based inks. One facility also used UV curable inks. The types of stencils used by each facility differed, with one facility using a dual-cured emulsion and the other using a direct photo stencil. During the thirty-day demonstration period, one facility reclaimed 16 screens, while the other reclaimed three times as many (48). In the laboratory, the system was tested on three screens (one with a solvent-based ink, one with a water-based ink, and one with a UV-curable ink).

Both facilities reported that the ink remover worked effectively. However, the facility that reclaimed 48 screens found that it took longer than their standard product to break down the ink. In contrast, the other facility had very good results with the ink remover; not only did it remove ink as well as the products the facility currently uses, but less product per screen was required. During laboratory-testing, the ink remover dissolved solvent-based and UV-curable inks quickly and easily, leaving little or no residue. Removal of water-based inks, however, required greater time and effort.

The emulsion remover performed very well at both facilities, dissolving the stencil quickly and easily. The facilities reported that the performance was even better than their standard products. During laboratory-testing, the emulsion remover dissolved the stencil, but required some scrubbing.



## Regulatory Concerns

Simple tables in each profile show which chemicals in the reclamation system are subject to Federal environmental regulations, such as the Clean Water Act and the Clean Air Act. Because the tables list individual chemicals, not specific products, they will help you to see if your facility uses regulated materials. You can also use the tables to find products that have fewer regulatory concerns.

# Describe how each system performed in five important categories. Compare each system and search for possible substitutes.



## Cost

The cost estimates listed in this section—along with information on occupational risk and regulatory concerns—will help you get a picture of what it might cost to use a particular system. The costs of each system include the basic purchase price of the products, as well as the costs of actually using them in a shop—labor hours required to reclaim a screen, costs of wipes, and the volume of product needed.

Remember, however, that these alone may not be the only indications of what it really costs to use a reclamation system. Other less obvious factors can be important, too: How flammable are the chemicals?—More flammable materials can cost more in storage requirements and insurance premiums. Are they regulated materials?—If so, this can mean added costs of staying in compliance. How hazardous are the chemicals to worker health or to the environment?—Hazardous materials can add to the expense of protecting workers and the environment.

The product applied to the screen for haze removal was a mixture of haze remover and ink remover in 1:4 to 1:1 ratios. Both facilities thought that the haze remover's performance was acceptable, and in most cases worked as well as their other products. In the laboratory, the haze remover lightened ink stains on all screens but did not remove them completely; a light ink stain was still visible.

### Cost

The adjusted cost per screen for Product System Epsilon ranged from \$3.08 at the facility that reclaimed a higher number of screens to \$5.29 for the other facility. The difference in costs between facilities is due to differences in the quantity of product applied, the number of rags used, and the labor time required per screen. The baseline cost per screen was \$6.27. Upon comparing each facility's calculated cost to the baseline cost, switching to System Epsilon would yield savings for both facilities. Estimated annual savings would range from \$1,500 at one facility to \$4,800 at the facility that reclaimed a higher number of screens.

### Risk and Exposure

Possible concerns for risks to worker health may result from using this ink remover on a daily basis. This ink remover can cause low inhalation exposures and possible concerns for risks of reproductive toxicity from cyclohexanone. Skin contact may lead to moderate exposures and possible concerns for risks from cyclohexanone, benzyl alcohol, and propylene glycol series ethers.

The emulsion remover can cause severe skin and eye irritation. Negligible concerns for risks to worker health may be expected when this haze remover is used on a daily basis. This haze remover can cause low inhalation exposures and negligible concerns for risks. Skin contact may result in moderate exposures and possible concerns for risks from cyclohexanone, benzyl alcohol, and propylene glycol series ethers. Direct skin or eye contact will result in severe irritation.

Skin exposures and their associated risks will be negligible if appropriate personal protective clothing is worn.

### Regulatory Concerns

The following table indicates those chemicals present in this system that are subject to federal environmental regulation. It also indicates chemical categories which may contain chemicals that are subject to federal environmental regulation. The presence of such chemicals and chemical categories may trigger reporting or other statutory requirements.

Chemical	CWA	CERCLA	RCRA U-list	RCRA F-list	CAA
Cyclohexanone		X	X	X	
Benzyl alcohol	X	X			
Ether					X

CWA = Clean Water Act; CERCLA = Comprehensive Environmental Response, Compensation and Liability Act; RCRA = Resource Conservation and Recovery Act; U-list - discarded commercial chemical products, all specification species, container residues, and spill residues thereof; F-list - hazardous waste from non-specific sources; CAA = Clean Air Act



## Risk and Exposure

Health risks that printers may face when using different screen reclamation chemicals are a major concern of all screen printing companies. *Designing Solutions for Screen Printers* presents information about specific chemicals that may be of concern in each system. While you may not be using the exact same products in your shop, your products may contain some of the same chemicals that are profiled.

You can use this information to help assess the risks of your own system, identify recommended safety precautions, and find products that may pose less risk.



United States  
Environmental Protection Agency  
Washington, DC 20460

Official Business  
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### Partners in the DfE

#### Screen Printing Project

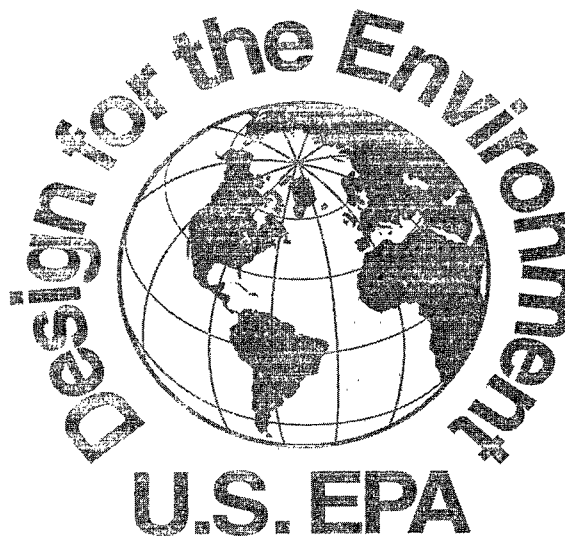
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## To order your free copy of *Designing Solutions for Screen Printers: An Evaluation of Screen Reclamation Systems*, contact:

Pollution Prevention Information Clearinghouse (PPIC)

U.S. Environmental Protection Agency

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You can also ask PPIC to send you a list of all publications available through EPA's Design for the Environment Screen Printing Project.



### About the DfE Screen Printing Project

The Design for the Environment (DfE) Screen Printing Project is a voluntary collaboration between representatives of the screen printing industry and the U.S. Environmental Protection Agency. The goal of the Project is to provide screen printers with information that can help them run their facilities in a way that is more environmentally sound, safe for workers, and more cost effective. The Project focused on screen reclamation systems, and gathered information on the performance, cost, and health and environmental risk trade-offs of different reclamation systems (ink removers, emulsion removers, and haze removers). While the Project specifically examined screen reclamation systems, the partners of the Project encourage printers to consider the environmental impact of all the products they use in their shops.



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