



Design for the Environment Flexography Project



What Is Design for the Environment?

The Design for the Environment (DfE) Program harnesses EPA's expertise and leadership to facilitate information exchange and research on risk reduction and pollution prevention opportunities. DfE works with both large and small businesses on a voluntary basis, and its cooperative projects attempt to:

- Work with specific industries to evaluate the risks, performance, and costs of alternative chemicals, processes, and technologies.
- Change general business practices to incorporate environmental concerns.
- Help individual businesses undertake environmental design efforts through the application of specific tools and methods.

DfE partners include:

- Industry
- Professional Institutions
- Academia
- Environmental and Public Interest Groups
- Other Government Agencies

Focusing on Flexo Inks



More than 1,600 printers in the United States use flexographic presses. These presses can be found in facilities ranging from small (less than 10 employees) to large (200 to 300 employees). Flexography is primarily used for printing on consumer packages or labels made of paper, corrugated, and plastic films. In addition, some consumer and commercial products have parts that are produced on flexographic presses.

Flexography involves printing from a raised image on a printing plate made from either rubber or photopolymers with highly fluid, quick-drying inks. The ink is applied to the raised portion of the plate, and the image is transferred by the plate to a substrate (e.g., paper, film, or board). The inks used for flexography are liquid and contain solvents or water. Selection of inks is critical to meeting the quality and performance requirements for a wide variety of substrates with varying printing parameters.

The conventional inks used for flexography consist of solvents made of volatile organic compounds (VOCs), which can pose risks to human health and to the environment. For this reason, they are regulated as air pollutants and hazardous materials. The VOCs in conventional inks contribute to ozone pollution and can adversely affect air quality. These inks also can have potentially detrimental effects when disposed of improperly.

The flexography industry has been evaluating and adopting alternatives to the conventional ink formulations in an effort to find cleaner and safer materials for printing images. The industry's efforts in this area have included evaluating waterborne and UV-cured inks, as well as press modifications and add-on controls. Adopting these technologies can reduce the potential for pollution, eliminate or reduce air emissions, and prevent the generation of hazardous wastes and other discharges. There are technical and environmental advantages and disadvantages associated with each of these technologies, however. These advantages and disadvantages might affect product quality, production efficiency, and energy usage, or involve the transfer of pollution from one medium to another, transfer of waste streams, retraining facility personnel, and modification or replacement of existing equipment.

The Design for the Environment (DfE) Flexography Project is a unique voluntary effort between the flexographic printing industry and the U.S. Environmental Protection Agency (EPA) that seeks to provide information about the advantages and disadvantages associated with solvent, waterborne, and UV-cured flexographic ink technologies. The project will assess the performance, costs, environmental and human



Recycled/Recyclable

Printed on paper that contains at least 20 percent postconsumer fiber.

health risks, and pollution prevention effects associated with these technologies. DfE's goal in working with flexographic printers is to help them make more informed choices now and in the future by easing the search for and evaluation of cleaner processes, products, and technologies.

How Did the DfE Printing Project Get Started?

DfE began working with the printing industry in 1992, when the Printing Industries of America (PIA) requested EPA's assistance in evaluating environmental claims for products. This effort ultimately grew into projects aimed at preventing pollution in three sectors of the industry: lithography, screen printing, and flexography. Each project addresses a different area of concern within the printing industry. For lithography the focus is on blanket washes; for screen printing the focus is on screen reclamation; and for flexography the project partners chose to look at the types of inks used. DfE flexography partners include the California Film Extruders and Converters Association (CFECA), the Flexible Packaging Association (FPA), the Flexographic Technical Association (FTA), the Industrial Technology Institute (ITI), the National Association of Printing Ink Manufacturers (NAPIM), the Plastic Bag Association (PBA), RadTech International, N.A., the National Institute of Standards and Technology (NIST), the Tag and Label Manufacturers Institute, Inc. (TLMi), the University of Tennessee, Western Michigan University, and individual printers and suppliers.

What Is the DfE Flexography Project?

The DfE flexography project has three key activity areas: technical studies, implementation tools, and outreach activities.

Technical Studies

The DfE Flexography Project is focusing its efforts on developing specific risk, performance, cost, pollution prevention, and process requirement information on conventional and alternative ink technologies in order to help flexographic printers make more informed decisions about the ink technologies that they use in their facilities.

The project is examining the environmental and human health risks of solvent-based, waterborne, and UV-curable ink technologies. The project is collecting information on hazards and environmental releases (i.e., releases to air, water, or land), energy consumption, and solid and hazardous wastes associated with the use of each technology. With this information, the project will assess the risks to human health and the environment posed by each of these flexographic ink technologies.

The performance of each ink technology will be evaluated in two ways: 1) by a laboratory under controlled conditions; and 2) by printers under real-world conditions of production. The information collected in the performance demonstration will be used to develop cost data for each ink technology. In addition, the DfE Flexography Project will identify workplace practice changes, pollution prevention options, and other steps that printers can implement to better utilize each ink technology.

Information on the comparative risk, performance, cost, and pollution prevention opportunities associated with these ink technologies will be included in the DfE Flexography Project's full technical report, the *Flexographic Inks Cleaner Technologies Substitutes Assessment* (CTSA). The draft CTSA is scheduled to be released for comment in 1996.

Implementation Tools

In an effort to encourage pollution prevention in the flexography sector of the printing industry, the DfE Flexography Project will create a variety of technical assistance tools for flexographic printers. For example, plans are in place to develop computer software that can help flexographic printers assess the profitability of pollution prevention investments using total cost assessment techniques. DfE is also planning to conduct pilot workshops for flexographic printers on how to use the software.

Outreach Activities

The project will create different informational materials based on the CTSA. The project partners will produce a simple, concise brochure to explain to printers the results of the technical work. A series of case studies also will be developed to help flexographic printers sort through some of the different factors that can make one ink technology a more attractive option than another. These and other products will be available on the Internet, making the information developed by the DfE Flexography Project easily accessible to printers and the general public.

How Can I Get More Information?

To learn more about the Flexography Project or EPA's Design for the Environment Program, contact:

EPA's Pollution Prevention Information Clearinghouse (PPIC)

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