

## WASTE SEGREGATION, RECYCLING, AND REUSE

printer's waste management program. Materials reported in the literature as being recycled by printers include paper, solvents, ink containers, reusable plate or cylinder boxes, pallets, and sometimes ink. Using returnable/refillable items or large totes, when available, can also cut down on packaging waste. Vendors or suppliers can be requested to provide returnable/refillable containers as part of their contract with the printer.

Cleaning rags/wipes (shop towels) covered in ink and solvent can be reused by sending them to an industrial laundry service. Many states now require this step. The wipes should be stored in an air-tight, self-closing, flame resistant container marked for recycling.

Looking for alternative materials that generate less waste and/or are less toxic in terms of human health, can provide a printer with economic as well as environmental benefits.

Working closely with vendors and pollution prevention technical assistance providers, within the constraints identified by the printing client, can lead to useable alternative materials or processes.

## RECYCLING INKS

Ink manufacturers have developed organic color replacements which are not as heavily regulated as their inorganic counterparts. Unfortunately, even if waste ink does not test hazardous, it may require disposal by a licensed hazardous waste management company.



## PRINTING PRESS

Improvements and/or modifications to existing printing equipment may be a suitable choice in a pollution prevention and waste reduction program.

Ink viscosity measuring systems cannot only control the viscosity of the inks to ensure quality printing but can prevent excessive use of solvent thereby reducing the potential pollution.

Web break detectors can reduce waste by informing the operator of breaks without creasing or smearing the web.

Automatic registration systems are available in several different types and styles. Registration is the precise fitting together of two or more printing images on the same paper in direct alignment with one another.

Installing automatic lubrication systems on the critical rollers, bearings and gears will reduce waste and conserve resources.

Other methods to reduce waste involve careful attention to operating parameters and instrumentation: installing automated plate benders, optical scanners to lock onto registration marks, automatic key settings, and ink/water ratio sensors.



# Common Pollution Prevention for Printing Services

## FOR MORE INFORMATION

Visit: [www.charlottecountyfl.gov/services/engineering/pages/stormwater-NPDES-public-education-outreach](http://www.charlottecountyfl.gov/services/engineering/pages/stormwater-NPDES-public-education-outreach)

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The fundamental steps in printing are referred to as imaging, pre-press, printing, and post-press operations. The type of printing process used depends on a variety of factors, including the substrate (e.g., paper, plastic, metal, ceramic, etc.), the length and speed of the print run, the required print image quality, and the end product.

The composition of wastes from each printing type varies, but overall, source reduction of these wastes will benefit printers by reducing raw material needs and disposal costs, and by lowering the long-term liabilities associated with waste disposal.

## MAJOR WASTESTREAMS

The three major types of wastes in the printing industry include:

**Solid Wastes** - In a general printing environment solid waste could consist of the following: empty containers, used film packages, outdated materials, damaged plates, developed film, dated materials, evaluate production, bad printing or spoilage, damaged products, and scrap paper.

**Wastewater** - Wastewaters from printing operations may contain lubricating oils, waste ink, cleanup solvents, photographic chemicals, acids, alkalis, and plate coatings, as well as metals such as silver, iron, chromium, copper, and barium.

**Air Emissions** - Printing operations produce volatile organic compound (VOC) emissions from the use of cleaning solvents and inks, as well as alcohols and other wetting agents

**Hazardous wastes**, defined and regulated by federal, state, or local governments, can be a subset of any of the three major wastestreams.

## JOB PLANNING

Planning allows for scheduling of the daily runs to reduce color changes and to run inks from lighter to darker. Both techniques reduce heavy cleaning steps. Using a computer controlled mixing program equipped with a digital scale for weighing inks can help reduce waste. Increased attention to the amount of ink mixed for specific jobs improves material use efficiency.

## START AT THE BEGINNING: GRAPHIC DESIGN

Waste can be reduced most efficiently from the inception of the printing project through graphic design choices. Preparing layouts that use the most efficient image size to the press sheet size reduces paper waste at the later stages of cutting and binding. Designers should also be made aware of inks containing heavy metal or other hazardous pigments and provided with information on non-toxic alternatives. Other graphic design options to consider include decreasing the amount of ink coverage of the layout and using non-coated, non-bleached paper, and recycled papers.



## BEST MANAGEMENT PRACTICES (BMPs)

(BMPs) are the most cost-effective way to decrease the amount of waste generated. BMPs require building employee commitment and interest in pollution prevention, as well as managerial support, to encourage participation in pollution prevention programs. This includes careful control of raw materials, practical scheduling, and job management. For example, a good housekeeping and maintenance program helps to ensure that all machinery and processes are working well with no leaking valves, tanks, etc. Wise planning of a print job through the entire process accomplishes the task with a low margin of error, consequently decreasing waste generation.



## MATERIAL HANDLING AND STORAGE

As with best management practices, wise material handling and storage can contribute to less waste generation. These procedures can virtually eliminate wastes from spoilage and improper storage.

A prime location for waste reduction is in the receiving area. The acceptance of unusable or damaged materials results in unnecessary wastes. All materials should be inspected and the unacceptable goods returned to the manufacturer or supplier. The savings here are twofold, the expense of the damaged goods and their subsequent disposal. Proper storage of chemicals should, at a minimum, meet the label specifications.

## REDUCING INK WASTE - GOOD OPERATING PRACTICES

Keep ink containers sealed and contents leveled; place plastic or waxed paper on top of the ink to prevent oxidation.

Scrape as much ink from empty cans as possible prior to disposal or recycling of ink tins

If the firm is large enough, presses can be dedicated to specific colors or as "hazardous inks" only presses, decreasing the number of cleanings needed for each press.

Use a standard ink sequence for process colors.

Schedule runs from lighter to darker to decrease the amount of cleaning necessary.

Recycle light colors into darker and specialty colors.

Return unused excess ink to the manufacturer.

Improve accuracy in job estimation.

Segregate waste ink colors for recycling.

Carefully monitor inventory to assure that older inks are used in a timely fashion and inks are only ordered if necessary.

"Prethink" printing jobs and counsel customers about the environmental impacts associated with particular color, paper, or printing method choices. Make sure that print jobs reflect the true cost of doing business and disposing of hazardous wastes.

## PROCESS CHANGES

Install an ink agitator or an ink leveller on the ink tray to prevent premature oxidation of ink.

Recycle waste inks in shop of through and ink recycling service.

Use a computer controlled mixing program in conjunction with a digital scale for mixing PMT colors.

Use an anti-oxidant spray to prevent skinning of ink in the ink fountain.

## PRODUCT SUBSTITUTION

Vegetable/soy inks

Ultraviolet curable inks

Electron beam curable inks

Water washable ink systems

Waterless inks