How to Reduce, Reuse, and Recycle Lithographic Ink Wastes

Ink waste creates a disposal cost for the printer, but also represents a less than optimum use of purchased raw materials. In the extremely competitive world of commercial printing, reducing ink wastes and their costs just makes good business sense.

This fact sheet discusses several ink management techniques that increase the opportunities to prevent, reuse, and recycle waste ink. A list of ink recycling service providers is also included.

Managing Ink Waste

Most lithographic inks are not classified as hazardous wastes under state and federal regulations. The exception is if ink contains pigments with heavy metals (for example, cadmium, lead or chromium), or if the ink is mixed with solvents classified as hazardous wastes. Proper disposal of ink wastes can be expensive, but is necessary to meet regulatory compliance requirements, and at least as importantly, to minimize liabilities faced by a printer. To be landfilled, waste ink must be in a non-liquid state or otherwise stabilized.

Many printers dispose of their inks by sending them to a fuel-blending service, which combines and forwards these and other wastes for burning at industrial boilers or kilns. Burning the inks reduces the potential exposure to litigation and cleanup costs to which a printer could otherwise be exposed if a landfill is used and it experiences groundwater contamination problems.

Whether waste inks are burned or landfilled, costs can be reduced by minimizing the generation of ink wastes and internally re-using inks whenever possible. Recycling services can sometimes be used to reclaim remaining waste inks, although presently these services are more practical for web press operations, especially those with larger amounts of waste inks. Whether ink can be reused or recycled is dependent upon the quality of the ink waste that is generated. Waste ink can typically be classified in one of the following two categories:

- Uncontaminated, excess ink - this category includes ink that has not been used in the press fountain. Although it can be recycled, reuse of this ink is usually a more cost-effective means of managing it.
- Contaminated, combined ink – this ink has been used in the press fountain and is commonly contaminated with paper fibers, solvents, or other colors of ink. For these inks to be recycled, they typically must be filtered, reconditioned, and reblended. The remainder of this fact sheet address strategies for reducing ink wastes, internally reusing inks whenever possible, and using recycling services for maintaining inks when use of these services is technically and economically practical.

Reducing the Volume of Ink Waste Generated

There are many practical ways for sheetfed and web lithographic printers to reduce the volume of waste ink generated:

- Help press operators to accurately estimate the amount of ink needed for each job through training in ink estimating techniques. Keep accurate records of the quantity of ink that is used for specific jobs, particularly for repeat customers' jobs or re-orders.

- Use a standard ink sequence - from light to dark ink.
- Monitor your ink inventory and use existing stock according to the "first in - first out" strategy. Test any out-of-date ink for usability before you consider it waste ink.
- Carefully label, log, and store special-order colors for future use rather than dumping them into waste ink drums.
- Donate ink that you no longer use to schools, or give the ink to other printers, rather than pay for disposal. (Colleges, universities and vocational/tech schools with graphic arts programs often have small on-site print shops.)
- Use an automatic ink leveler to maintain the desired ink level in the fountain.
- Dedicate presses to specific colors or special inks to decrease the number of cleanings required for each press.
- Keep in communication with ink suppliers regarding proper use and handling procedures for their inks.

Ink Management Techniques for Better Reuse and Recycling Opportunities

To maximize the opportunities for ink reuse and recycling:

- Do not mix small quantities of leftover or obsolete inks with different colors of ink.
- Keep different types of ink separate.
- Store excess ink in properly sealed and labeled containers. Place plastic or waxed paper on top of sheetfed ink, and/or spray the ink with an anti-skinning agent, or cover the ink with an oil consistent with printing inks to prevent oxidation.
- Do not dip knives deeply into sheetfed inks. Removing the ink evenly from the top surface of the ink can reduces the surface area of the ink exposed to oxidation.
- Transfer used ink back to the original empty containers and prevent drying by keeping the ink containers sealed.
- Clearly mark the containers used to collect waste ink to prevent mistakenly discarding it. Avoid contamination with solvents and trash (e.g., floor sweepings, cigarette butts, etc.).

Don't treat excess ink as waste. Instead, manage it like a manufacturing by-product that should be re-introduced, as much as possible, back into the manufacturing system.

Reusing Excess Ink

Excess ink results from overestimating ink usage at the press or at the time of ink purchase. Whenever possible, return unopened cans of excess ink to the supplier. Reusing excess ink in one of the manners described below can reduce both your virgin ink purchasing costs and your waste ink disposal costs:

- Mix excess ink, including black and/or colored inks, on-site to produce usable ink. Many printers like the quality of the black ink produced from mixing colored inks, because the colored inks are of such a high quality which produces a richer, darker black tone.
- Mix excess ink with virgin ink of the same color, provided that the excess ink is contaminant-free.
- Use a computer software program, such as "The MixMaster" to keep track of ink in your inventory and to produce recipes for needed PMS colors from excess ink in stock.
- If volume is large enough, consider installing a computerized color match system equipped with color scanners.

Recycling Waste Ink

Ink recyclers take waste inks and reprocess them, along with necessary additives, to make recycled ink. Opportunities for recycling web offset inks are growing, but are currently very limited for sheetfed inks. Consider the following advantages to recycling waste ink:

- The cost of fuel-blending or landfilling the ink can be avoided. The avoided cost typically results in a savings of $100 to $200 per 55-gallon drum.
- Liability associated with ink disposal is minimized.
- The recycled ink meets new ink specifications and is available to you at a savings compared to new ink prices.
- Business with environmentally sensitive customers may increase, if they are aware that you recycle.

Typically, ink recycling service providers filter the ink to remove impurities, mix the ink with oil or otherwise adjust its physical characteristics. Some blend the recycled ink with new ink to ensure that product specifications are being satisfied. Some ink recyclers will mix colored inks to produce black inks. Others have the capability of recycling color for color, if large volumes of colored ink are generated. Most ink recyclers will return your recycled ink to you.

Some service providers will accept ink for recycling which is not returned, but sold to other printers.

Current Status of the Availability of Ink Recycling Service Providers

SHWEC has identified ink recyclers that serve printers located throughout the United States and Canada. Most of these companies offer recycling services for both heatset and non-heatset inks from web presses.

Economies of scale associated with ink volumes affect the feasibility of recycling. Therefore, accumulating a large quantity of waste ink reduces the cost of recycling the ink on a per pound or per drum basis. However, as demand increases, and the technology for processing sheetfed ink improves, it is likely that the availability and affordability of sheetfed ink recycling will increase.

Another limitation on the recycling of sheetfed inks is the difficulty of removing "skinning" layers, which are caused by drying agents in the ink. Removing and disposing of each "skin," or dry layer, is necessary to recycle ink in some processes; however, the process is labor intensive, and reduces the overall volume of ink available for recycling. "Skinning" can be prevented by placing an anti-oxidant material in waste sheetfed ink drums, or by covering the ink with a thin layer (1/2 inch) of oil that is compatible with the ink.

Printers that are successfully reusing and recycling lithographic ink include General Litho Services in Minneapolis, MN and Quad Graphics, headquartered in Pewaukee, WI. These companies are saving money, improving shop productivity, and reducing environmental liability through reducing ink wastes.

Ink Recycling: Service Providers (Tables 1-4)

The following list is provided solely as a service to printers desiring more information about recycling lithographic inks. The information is voluntarily supplied and listed alphabetically. It is not necessarily a complete list of available services or suppliers and does not represent an endorsement by SHWEC.

By providing the list, SHWEC does not represents that the companies listed are or are not in compliance with applicable laws. Users of this list should use appropriate caution and discretion in assuring that providers of ink recycling services follow applicable federal and state laws when transporting and processing ink.

TABLE 1: Sheetfed Lithographic Printer's Ink

Company	Ink Recycled	Process	Service Area	Min. Req'd	Reported Cost* (as of 10/12)
Recycled Printers Ink and Pigment 4409 Shabbona Ln Lisle, IL 60532 Contact: Frank Prasil (312) 498-7057 Email: frankprasil@yahoo.com recycledink@yahoo.com	Sheetfed recycled into sheetfed ink.	Ball mill grinding on or off-site. All of ink recycled. Return-able to new ink specs.	Chicago Area to start	Call for contract infor-mation.	Costs are comparable with virgin ink.

TABLE 2: Web Lithographic Printer's Ink

Company	Ink Recycled	Process	Service Area	Min. Req'd	Reported Cost* (as of 10/12)
Pro Active Recycling 1580 20th St. E. P.O. Box 368 Owen Sound, Ontario Canada N4K 5P5 Phone: 1-888-60-PA-INK (1-888-607-2465) Fax: 1-519-371-7198 Website: proactiveink.com Email: info@proactiveink.com	Web heatset and non- heatset. Mixed colors to black; black to black.	Centrifuge and filter based. Processed off-site Quality checked and returned. Tanks provided.	Canada and U.S.	200 gal/ month depend-ing on existing services provided in your area.	Recycled ink costs are approximately 80% of virgin black or 65% of virgin color ink costs. Price negotiated on volume.
Eco-Ink Corp 1636 Gervais Ave East Maplewood, MN 55109 651-243-4389 Email: ecoinkusa@live.com Website: www.ecoinks-offsetrecyclewasteblack.com	Non-heatset and sheetfed	Filtering, then heated up with mixer, filterization again. Then added back into mixture. Final product always virgin black	Nationwide, any area is welcome	Varies, but no specific minimum stated. Contact for quotes	25-35% less than competitive prices

*Additional savings result from avoiding disposal costs for used ink.

TABLE 3: Ink Reclamation Systems

Company	Ink Recycled	Process
Semler Industries, Inc. 3800 N. Carnation Franklin Park, IL 60131 Website: http://semlerindustries.com Phone: 847-671-5650 847-671-7686	Lithographic and flexographic	Ink Filtration and Re-blending equipment.

TABLE 4: Ink Reblending

Company	Process
Mixmasters, Inc. 11 Colmer Road Lynn, MA 01904 Website: http://www.mixmasters.com/home Phone:800-332-9321(within the US) 781-593-9321 Contact: Michael Holbrook	Software to guide reblending.

Prepared by: Wayne Pferdehirt, Waste Reduction and Management Specialist, SHWEC. Assisted by Michael Rogney, Dan Boehm, Danelle Kratzer, Kristin Andersen, and Robert Gifford.

For more information, contact the University of Wisconsin-Extension, Solid and Hazardous Waste Education Center (SHWEC) at 610 Langdon Street, Rm. 317, Madison, WI 53703. Telephone: 608/262-0385, Fax: 608/262-6250.