

*Using Soy-Based Inks in  
The Lithographic Industry*

Current Topics in the Lithographic Industry  
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ITGRA 182 – 001 Offset Lithography  
April 3, 2007

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What's that, soy ink: boring, drab, heard it before... Or have you? Everyone knows about the potentially planet-saving characteristics of soy-based ink and how they have fewer VOC emissions than traditional petroleum inks. Unfortunately most people stop there and never learn about any of the other benefits that can come from the use of natural inks. Upon closer inspection, there are numerous other reasons that should be driving lithographic printing companies toward the mass adoption of soy-based ink.

Despite the over importance that has been placed on the ink's promise of reduced VOC output, and the unoriginality of the ensuing celebration, the reduction is actually rather significant. First, an explanation of VOCs (Volatile Organic Compounds) and how they relate to lithographic inks is in order. VOCs are chemicals that have a high enough vapor pressure to vaporize at room temperature and expand into the air. These gases are of the greenhouse variety that we typically associate with global warming. In relation to the printing industry, the speed at which chemical solutions dry (vaporize) can be used to give a rough approximation of the chemicals' VOC potential. Faster drying compounds tend to have high VOC counts, while slower drying ones are typically rated low. In the pressroom, chemicals contributing to this effect include the ink vehicle and nearly all of the solutions associated with cleaning the press. Thus the problem.

The VOCs which are most often reduced by using soy ink are those resulting from the use vehicle that transfers the ink pigment. In traditional petroleum-based inks, the level of VOCs can range from 20-30%. By using soy-based inks, this percentage can be reduced to a range of 5-20%, which is especially noteworthy in large, long-run

jobs, as the savings will compound over time. VOCs can be further reduced, as soy and vegetable-based inks can be cleaned with solutions that have lower VOC potentials themselves. This leads to a double reduction in the VOCs released.

In addition to the benefits that arise from the lowering of VOC levels in the atmosphere, soy inks are good for the environment in other ways as well. When soy beans are growing, they perform like all plants do and work towards lowering the CO<sub>2</sub> levels in the air through photosynthesis. This leads to even larger reduced quantities of greenhouse gases during the production of soy-based inks.

When printing, the transparency of the ink vehicle largely affects the amount of pigment needed for printing. With a more transparent vehicle, less pigment is needed to achieve the same color intensity as with more opaque solutions. A vegetable-based oil is typically fairly clear, which means that this type of ink is particularly suitable when saturated colors are desired. The use of less pigment means that the same amount of oil can be spread out and used to a much larger potential in printing jobs, with some sources estimating increases in use of nearly 15% more. This theoretically reduces the costs associated with printing, as jobs use less ink.

Currently, prices for soy ink are slightly higher than for their traditional, petroleum-based ancestors. Though inks have gained wide support from the newspaper industry, the cost for black, soy-based ink can still be up to as much as 25% higher. These extra costs arise from the new production procedures and facilities that must be designed and improved upon to ensure quality ink mixes. The benefits to the environment from using soy and vegetable-based ink far outweigh the extra cost, and as mentioned above, the extended use that can come from their transparency may

completely eliminate the difference in certain situations. On a smaller scale, the marketed use of environmentally friendly inks may allow the printing company to draw in new customers, such as activists and the green-minded.

Printing with natural inks can also have impacts on the extent to which printed substrate can be recycled. When organic ink is used during printing, the products that are made can be broken down and the ink separated through more natural methods. For example, when traditional petroleum inks are used and the printed paper is allowed to biodegrade, there is an additional risk of soil and water contamination from the absorption of the chemicals in the ink. Soy-based chemicals, coming from the natural resources of the land, can be broken down naturally with no threat to the environment. Paper recycling is affected by this issue as well. Just as the soy inks can be removed more easily from the press, they also ease their removal from printed material as well. Weaker chemicals can be used to break the ink down and thus spare the planet from the harmful VOCs that the cleaners contain. This also leads to less damage to the paper fibers, allowing them to be reformed into stronger and whiter papers.

With all the benefits that the development of naturally-based inks has afforded us, it is no longer hard to see why the industry is rapidly shifting to their use. Someday in the future, the environmental harm derived from the lithographic industry may drop to negligible amounts, and we will be able to largely attribute that change to organic inks.

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