

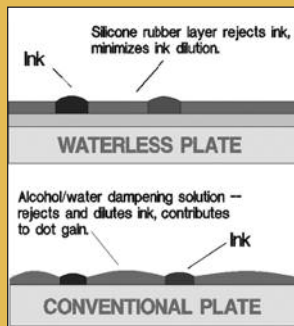
PRINTING TODAY

WATERLESS IS ENVIRONMENTALLY FRIENDLY

Some designers, production managers, and print buyers prefer waterless printing because it offers environmental advantages. Without conventional fountain solutions, often containing alcohol and other chemicals to accelerate drying, waterless printing releases no VOCs (volatile organic compounds) into the atmosphere. Even non-alcohol-based solution substitutes must be treated as hazardous waste, so their elimination is also an advantage.

Because the complex and inherently unstable process of balancing water and ink (which greatly affects how the ink looks on paper) is no longer necessary, press make-ready times can sometimes be reduced – reducing wasted paper and ink.

Waterless printing can also produce good results on previously unacceptable paper – like recycled paper – making its use possible.



Waterless plates employ less chemistry, more physics. Silicone rather than a water-alcohol fountain solution repels the ink from non-image areas. Because solution does not dilute the ink, dot gain is reduced and images can be reproduced with smaller dots. The result is sharper images.

Waterless Printing: An Alternate Technology

Waterless printing is a printing process that, unlike conventional lithography, eliminates the water normally used as part of the process. It uses chemistry and physics in a way that generally yields greater detail in the final printed product. In fact, the nature of waterless plates is such that they can print at up to 300, sometimes even more, lines per inch.

History

The waterless printing process was originally developed by the 3M Company in the 1960s. Marketed as “Driography,” it was received in the marketplace with ambivalence. Among the problems originally encountered were relatively short plate life and poorly performing inks. Ultimately, 3M dropped its pursuit of the new process and sold its patents to the Japanese company, Toray Industries. Additional related patents were purchased from the Scott Paper Company.

Toray, with substantial experience in developing and manufacturing synthetic materials, continued research and introduced its Toray Waterless Plate in 1977. The plate was a positive image plate (used primarily in Japan) so it wasn’t until 1982, when a negative plate was available, that it was introduced into the U.S. market. Limited marketing, skepticism based on 3M’s unsuccessful process, and limited sources for special waterless inks has meant slow acceptance by American printers. Recently, waterless printing has seen a notable increase in use in the U.S. and worldwide.

What it is

In waterless printing, instead of press operators managing a chemical process in which water and ink are carefully balanced to control the application of ink to plates and paper, an alternate mechanical process that uses no fountain solution is employed. The printing is usually accomplished on conventional printing presses retrofitted with ink heating and cooling mechanisms that maintain a narrow range of temperatures on the surface of the plate.

In conventional lithography, a plate is planographic – the image and non-image areas of an aluminum plate are the same height. Through a photochemical process the fountain solution, water or alcohol, repel the ink from the non-image area. In waterless printing, the Toray plate is aluminum-backed but coated with a photosensitive polymer. Processing the plate results in an over-coating of silicone rubber – which repels ink – in the non-image areas. Unlike a conventional plate, the image area is slightly recessed – made up of tiny depressions that accept the ink.

In addition to Toray photosensitive waterless plates, digital direct-to-plate (DTP) products have begun to emerge. These plates contain a light-absorbing/image-forming layer between the top silicone layer and an aluminum or polyester base. A laser inscribes the image in the middle layer and the heat from the laser dislodges the top layer of silicone – exposing the underlying ink accepting base.

Waterless Toray plates can handle anywhere from 50,000 to 600,000 impressions depending on factors like the abrasiveness of the paper used. A competing DTP system, by Presstek, produces plates with run lengths of 10,000 to 50,000 impressions.

Ink

In a conventional system, the fountain solution keeps the non-image areas of the plate wet with water or alcohol to prevent ink acceptance. This solution is usually chilled which helps eliminate heat buildup on the press. Evaporation helps cool too. The lack of fountain solution in the waterless process means heat buildup, which can create problems, in part because higher temperatures decrease the viscosity of the ink – sometimes causing the ink to adhere to the silicone non-image area.

Because ink temperature at the plate is critical for consistent results, inks had to be developed with specific viscosity characteristics. For proper performance, the ink viscosity has to match the operating temperature of the plate. Since the viscosity and temperature are so critical, inks are manufactured in different viscosity ranges to match the operating temperature range of a given press.

Benefits of waterless

Fountain solution actually dilutes the ink in conventional printing, so it can result in the printed dots soaking into the paper and spreading – dot gain. In waterless printing, ink viscosity is more stable, resulting in low dot gain – making it possible to print finer, sharper dots, enhancing detail. This means continuous tone photography can be printed at up to 300 lines per inch, occasionally much higher. And that means much greater clarity and detail. Also, because there is no need to constantly balance water and ink, it is easier to obtain more consistent color throughout the run.

Another benefit is higher ink densities. Because higher lines per inch can be achieved, ink – and color density – is increased; color is more intense. Waterless printing is also considered more environmentally friendly because there is no need for chemical fountain solutions.

Press make-ready time can be less with waterless, resulting in less paper and ink waste. On the other hand, press set-up time can be greater.

When to use it

Because most printers have not fully adopted waterless printing, press set-up times, the cost of waterless plates and other factors mean it is comparable to or a bit more expensive than conventional printing. The slight additional cost is generally justified when reproducing continuous tone images that benefit from a high degree of detail and greater tonal ranges. Art books and high-end consumer catalogs are often cited as examples of good applications for waterless printing.

In some cases, designers' and corporate production departments' commitment to the environment is the primary basis for deciding to go waterless.

Ask your printer to show you samples of his or her waterless printing work, discuss whether cost variables are significant for your project, and consider whether what you want to reproduce will really benefit from the greater detail waterless offers.