

New-Age Ink from Epson Takes Inkjet Printing to New Heights

By John Boyd

For a number of years manufacturers of inkjet printers have put a great deal of energy into refining their printing technologies and adding new features to their machines. But the industry has not seen the same kind of attention paid to the most fundamental of all printing technologies—the actual inks that create the documents, images and photographs that users buy these machines to produce. That's all changed in the last couple of years with the introduction by Seiko Epson ("Epson") of an advanced new ink called DURABrite™ (PX Ink in Japan) and then the more recent launch of an enhanced formula of this revolutionary pigment-based ink.

DURABrite™ provides such a long list of advantages for users, including richer colors and greater highlighting and shadowing, that Epson is planning to employ

it with its forthcoming inkjet printer models.

Anyone who has accidentally spilled even a small drop of water on a newly printed document knows only too well the deleterious effect it can have on dye-based inks. Similarly, in humid environments, handling such documents with damp fingers can often cause smudging. This is because dye-based inks are water soluble and therefore maintain a poor waterfastness.

"By comparison, the pigment-based DURABrite™ is a hydrophobic ink and has almost perfect waterfastness," says Minoru Usui, a director and deputy chief executive of Epson's Imaging and Information Products Operations Division. "So much so that documents printed with this ink can actually be submerged in water without the ink coming off the page."

This resistance to water, he adds, makes DURABrite™ ideal for users who want to create printed work that will be exposed to the elements, including fliers, signs, menus and postcards.

It's a similar story of two inks when it comes to damage caused by light. "The particles that compose DURABrite™ are considerably larger than those in dye-based inks," Usui explains. "When a document is exposed to light over time, the light first attacks the outer edges of the particles, and image-fading sets in as a result. Because of the greater size of the DURABrite™ particles, the inner area of each particle retains its consistency longer, extending the life of the printed document or image."

In accelerated testing of prints displayed indoors under glass and exposed to light, Epson researchers found that documents printed with DURABrite™ recorded a lightfastness of up to 80 years when printed on special paper.

In a similar manner, the large particulate nature of DURABrite™ also helps maintain the ink's gasfastness. This helps the ink to resist attack from atmospheric gases like ozone, which causes images and printing on documents to break down and deteriorate.

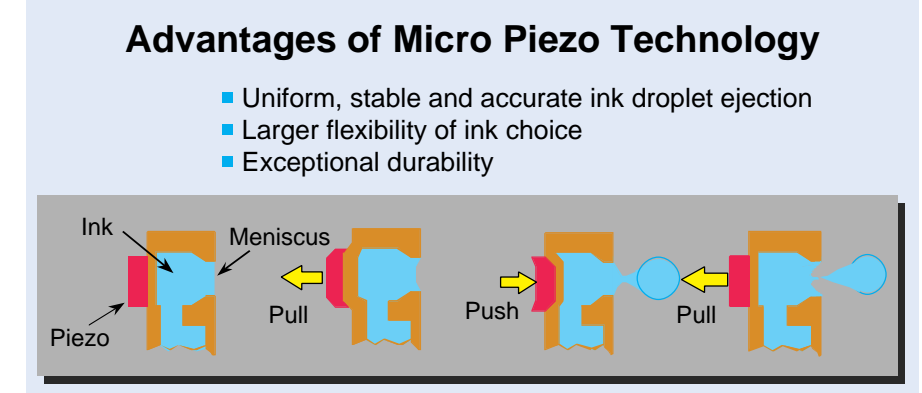
Researchers have worked to further enhance the ink's durability and stability by incorporating a process that encapsulates DURABrite™ particles with resin. This provides two benefits. As well as acting as a protective coating for the ink, the resin assists in the ink's adherence to the paper and other media.

Yet another inherent advantage of pigment-based ink is that the pigment particles remain on the surface of the paper. Dye-based inks, on the other hand, tend

to penetrate relatively deeply into the fiber of the paper, spreading slightly as a result. Because DURABrite™ pigment particles bond strongly to the surface of the paper, text and images retain their sharpness, while colors remain vivid.

This absence of particulate penetration also reduces the "bleed-through" effect common to dye-based inks. This "can become a problem when users wish to print on both sides of the paper, without having the printing on one side interfering with the other," notes Usui. "In such cases, DURABrite™ is ideal and can even be used to print on both sides of recycled paper without bleed-through becoming a problem."

Epson has also optimized DURABrite™ for plain and matte papers, so that users don't need to purchase more expensive paper to get the best print quality. Ordinary ink resins are hydrophilic in nature, and therefore induce the solvent and pigment particles in an ink to penetrate into the paper, effectively diminishing color reproduction. "But we have reconstructed the resin used in DURABrite™ so that it is hydrophobic in nature," explains Usui. "This allows DURABrite™ pigments to



bond unimpeded with the paper's sizing agents and remain on the surface of the paper, resulting in a more faithful reproduction." Yet, at the same time, he adds, DURABrite™ is also capable of producing high-quality images on glossy and semi-gloss papers, "providing users with the widest possible range of media choices."

In order that home and small office users can take advantage of all these merits, Epson has launched a new high-speed inkjet printer, the EPSON Stylus C82, and a new all-in-one EPSON Stylus CX5200. Those printers have been designed specifically to exploit DURABrite™'s superior characteristics and include inkjet heads that are optimized to complement the ink's unique composition.

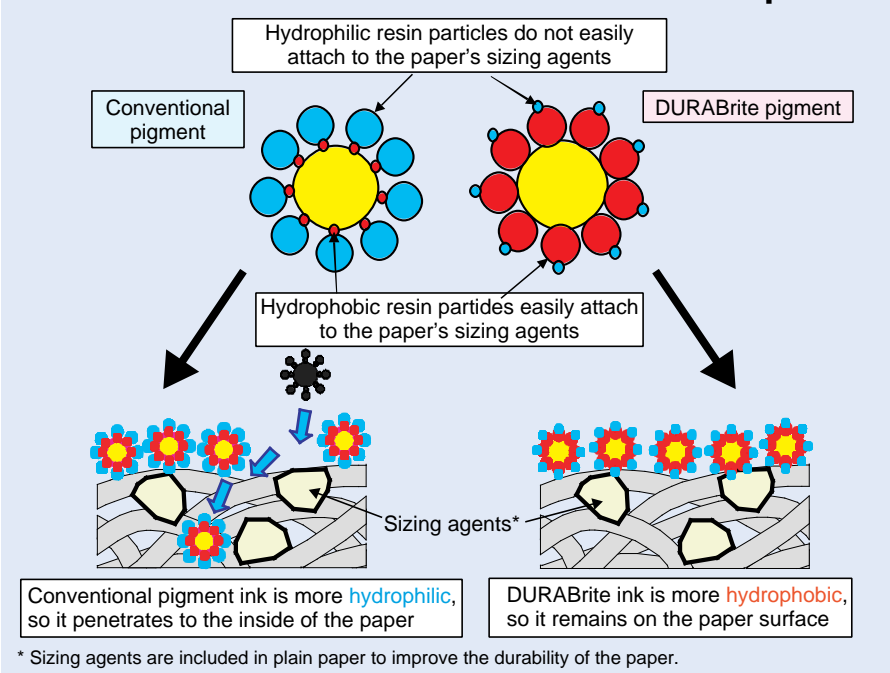
The EPSON Stylus C82 is Epson's fastest four-color desktop printer to date—delivering 22 pages of text per minute in

monochrome and up to 11 pages per minute in color, when used in Economy Mode on plain paper. The printer also incorporates Epson's advanced imaging technology called Resolution Performance Management. This enables the printer to place up to three different sizes of ink droplets on the page, with the smallest droplet measuring a minute three picoliters (3 trillionths of a liter). This flexibility and precision control of the printing action results in a resolution as high as 5,760 × 1,440 dots per inch.

"So in addition to fast output, the C82 together with DURABrite™ provides users with the highest level of text and photo-quality printing possible on plain or recycled paper," Usui points out. "This is a big step in helping users reduce their printing costs."

Only Epson is able to offer customers all these advantages because its inkjet printers alone in the industry are equipped with the company's Micro Piezo print-head technology, which relies on piezo mechanical pressure to eject ink droplets. By comparison, competing inkjet printer manufacturers use a method that relies on heat to eject the ink, a method not conducive to employing pigment-based inks.

Conventional and DURABrite™ Pigment Inks: Their Structures and Behavior on Plain Paper



The EPSON Stylus C82 (left) and the all-in-one EPSON Stylus CX5200 (right) use new EPSON DURABrite™ ink technology that enables the printer to output amazing results on plain or even recycled paper.

John Boyd is a freelance writer based in Yokohama. He writes for a number of publications and has covered the IT industry for the past 17 years.